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The Farmer's Digest

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The Farmer's Digest

Volume 6 November, 1942 Number 6

What Can Farmers Buy?

Condensed from Kansas Farmer

Raymond H. Gilkeson

RESTRICTIONS, rationing, quotas, curtailments, production stoppages all leave farm folks in a quandary as to what they can buy to fill their needs. To bring this information up-to-date we checked with Washington officials. This is the situation at present. Sharp cuts in a number of lines are predicted for 1943.

Generally speaking, farmers can buy ordinary farm machinery of all kinds without a priority rating. Any farmer can go to his customary dealer or supplier to obtain the items he wants. However, he may have to shop around to find a dealer or supplier who has not exhausted his quota of some items.

Farmers do not need a priority rating to obtain machinery and implements of a strictly agricultural nature that are essential to the production of farm commodities. Such implements are covered in a blanket priority order (L-26), with a preference rating provided for the manufacturer to obtain materials.

For the current year the farm equipment order establishes a quota on production of farm machinery, the average being 83 per cent of 1940 production for new machinery, and 150 per cent for repair parts. *The quota for* 1943 *has not been fixed, but is expected to run well below that for* 1942. It is important to remember this point.

The 83 per cent figure for 1942 production is an average figure and does not apply in the same way to each type of new farm machinery. The output of milking machines, for instance, can be up to 206 per cent of the 1940 production. For potato planters the quota is 72 per cent. For tubular steel wheelbarrows, hog troughs, and portable corncribs the quota is zero. The items are rated according to their use in increasing production of essen-

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tial foods. No quotas are provided for crawler-type tractors, since the entire output goes to military uses and war construction; extreme, emergency cases in agriculture for such tractors are handled by the War Production Board.

Specifically as to repairs, it is advised that farmers keep check over equipment and order needed parts in advance, so manufacturers can plan their production and have a supply of parts ready when farmers need them. As a part of Preference Rating Order P-100, it is possible for a farmer who repairs his machines himself, or the repairman who does it for him, to apply an A-10 rating on his orders for necessary materials. PD-1A is the standard form of the War Production Board for individual applications for priority assistance.

Before making any sales of repair parts for track-laying tractors, dealers must obtain a statement of the type of track-laying tractor to be required, the purpose for which it is to be used, and the minimum quantity of parts necessary to put the equipment in serviceable condition.

Farm Hardware

Farmers do not need a priority rating to obtain nails, staples, fencing, small pipe, and bale ties which are in the hands of local dealers. The War Production Board has provided for distribution of such items thru warehouses to suppliers and dealers in limited quantities on a quota basis. There are general shortages of these items due largely to necessity to divert all available steel to vital armament production.

Fencing materials, particularly barbwire and woven wire, are especially difficult to get for civilian use, due to the large amount taken by the army and Lend-Lease programs. The Department of Agriculture is now working with the War Production Board to obtain an allocation of fencing materials earmarked for agricultural use. Any such allocation made will be distributed thru regular retail channels.

As to hand tools, such as hammers, saws, pliers and similar equipment, farmers will still be able to purchase these tools if the local dealer has a supply. If a supply is not available locally, it will be necessary to wait until the dealer receives an additional supply, or submit an application in an effort to obtain a preference rating sufficiently high.

Electric Motors and Wiring

Heavy military demands and limited production of copper have resulted in drastic curtailment of electrical products for civilian use. Heavy-duty electric motors not considered an integral part of farm machinery can be

obtained only by submitting a PD-1A form to the War Production Board. Small motors may be purchased without priorities if in dealers' hands. Copper wiring and electrical extensions are approved only rarely and upon very convincing evidence of emergency needs.

New electric motors will be released only for the most important war and civilian requirements. Farmers should exhaust every possible means of locating used equipment before filing application to WPB for a motor.

Plumbing and Heating

Sale or delivery of any item costing not more than $5 is permitted, provided it is part of an order totaling no more than $10; sale or delivery also is permitted of any equipment on an A-10 or better preference rating. Sales may be made also if the buyer certifies that the equipment is needed to complete an authorized construction project.

Cooking or heating stoves or water heaters may be sold to householders where no other equipment for cooking or heating purposes is available.

Farm Construction

All construction not connected with war needs must receive WPB authorization where the cost exceeds specified limits. Authorization must be received for dwelling construction costing more than $500, or for any other farm construction costing more than $1,000. Farmers should see their County War Boards about making application on Form PD-200 and 200A for projects above these amounts.

Such construction projects must be essential to meet agricultural production goals on the farm, must be consistent with sound agricultural practices, and must keep use of scarce materials and equipment to a minimum. In the case of dwellings, the house should be used by a person or family whose full-time labor is essential to the operation of the farm. Construction of a new house should not be recommended if a present house can be remodeled or repaired.

Farmers who have applied for authorization and priority assistance can safely continue with their building plans when they receive approval for construction even if they fail to obtain priority assistance, altho lack of priority assistance may make it necessary to omit part of the equipment desired.

No priorities are needed to make purchases from supplies of nails, ordinary sizes of pipe, hardware, and similar items in the hands of retailers. In ordinary cases priority will not be given to farmers for metal roofing. A recent order limits the manufacture of metal roofing for general sale to repair and main-

tenance only; farmers need no priority assistance to obtain metal roofing for these purposes. Likewise, farmers need no priority assistance to obtain such barn equipment as stanchions and water bowls, if the local dealer is able to obtain them.

When a certificate of authority to begin construction has been issued, which includes plumbing and heating equipment, a farmer may purchase such equipment without priority.

Farm Machinery Order

The Farm Machinery and Equipment Order provides quotas for a long list of items under the following general headings:

Planting, seeding and fertilizing machinery, plows and listers, harrows, rollers, pulverizers, stalk cutters, cultivators and weeders.

Harvesting machinery, haying machinery, machines for preparing crops for market or use, tractors, engines, farm wagons and trucks.

Dairy machinery, spraying outfits, farm elevators, pneumatic domestic water systems, barn and barnyard equipment, poultry farm equipment.

Beekeepers' supplies, portable corncribs, grain bins, farm gates, lighting plants, silos.

Wheelbarrows, wood-sawing machines, hand tools, horseshoes, horse-shoe nails, electric fence controllers, harness hardware, irrigation equipment.

Production has been stopped at varying dates for numerous other manufactured articles of interest to farmers, altho these can be purchased where they are available in dealers' stocks. On the list are domestic oil burners, domestic mechanical refrigerators, domestic washing machines and ironers, such electrical appliances as toasters, waffle irons, flat irons, roasters, food mixers, juice extractors, percolators, heating units for ranges, water heaters and radiating heaters, electric ranges and fans, metal household furniture, including kitchen cabinets, vacuum cleaners and radios.

Curtailed production, altho not discontinuance, of the following items using steel should be noted: Bedding and mattresses, domestice cooking ranges and heating stoves, domestic coal stokers, domestic hot-water heaters and storage tanks, domestic ice refrigerators, razors and razor blades, and sewing machines.

Agricultural Bags and Cordage

The situation on agricultural bags was directly affected by developments in the Orient. Supplies of burlap, jute and Manila fiber come from that section and were practically cut off by the Pacific war zone. This has meant taking care of needs from sup-

plies already on hand in this country or enroute at the time of Pearl Harbor.

Burlap bags are available only in limited quantity. Arrangements have been made for the release of certain grades of cotton osnaburg to help care for the situation.

Manila fiber is reserved almost exclusively for military needs and other types of twine have been made available. However, some Manila fiber is turned to agricultural requirements.

Fertilizers

As to superphosphates for fertilizer, there is sufficient sulphuric acid, rock phosphate and superphosphate production capacity in the country to continue a plentiful supply of this fertilizer material. In the case of potash, there are production facilities to supply more than has been used for farm purposes in any previous year; greater demand is anticipated; however, the supply should be sufficient to fill the national need, altho there may be dislocations which may cause shortages in a few areas.

All chemical nitrogen is under allocation by the War Production Board. Steps have been taken to prohibit use of chemical nitrogen on crops of which we have ample supplies, and on which nitrogen is not a particularly important factor. But there probably will be some shortage even for essential crops.

Should a further shortage of transportation facilities develop, the fertilizer supply situation may be further complicated, since fertilizer supply is dependent on transportation.

Insecticides

Supplies of copper compounds, which were adequate this year, may be tighter next year. The prospect for arsenicals next year is not so good. Most of the burden may be taken up by lead arsenate. Calcium arsenate for cotton will be given sympathetic consideration. Pyrethrum probably will continue on present reasonably satisfactory basis. The rotenone situation is not expected to improve; strict provisions of the rotenone order probably will prevail for two years.

The situation regarding grain fumigants is satisfactory and probably will continue so for some time.

Availability of Specific Items

Items listed here are, or are not, available for farm purchase as indicated:

Autos: Strictly rationed.

Batteries: Manufacture limited but sufficient supplies anticipated.

Brick: Generally available. Limited only by general restriction on construction.

Bee Equipment: Comes under

farm machinery quota (100 per cent of 1940 production). However, wooden beehives are unrestricted.

Belts: Not limited, altho materials have been modified.

Canning Jars of Glass: No restriction.

Concrete Products: Generally available. Limited only by general restriction on construction.

Cement: Generally available. Limited only by general restriction on construction.

Corrugated Siding: Limited to repair and maintenance, except old stocks still in dealers' hands.

Cream Separators: Under farm machinery quota: 350-pounds an hour or less capacity, 67 per cent of 1940; 351- to 500-pounds an hour, 213 per cent; 501-pounds an hour and over, 157 per cent.

Ensilage Cutters: Under farm machine quota, 90 per cent of 1940.

Engines: Under farm machine quota, according to size, 18 to 93 per cent of 1940.

Fence and Fence Posts: Available supplies delivered without priority.

Feed Grinders: Under farm machinery quota, 100 per cent of 1940.

Fertilizers: Supplies to date sufficient. Nitrogen for small grains to be limited this fall.

Feeders: Manufacture ordered stopped on metal feeders; purchasable where available; wooden items restricted to 50 per cent of 1940.

Fabricated Building Materials: Some restrictions. Can buy if available in retail outlets.

Grain Bins: Steel bins are restricted, but not wood bins.

Gasoline: Rationed in Atlantic Coast States and reduced 25 per cent in adjoining buffer areas.

Hay Choppers: Under farm machinery quota, 95 per cent of 1940.

Harness: Harness hardware under farm machinery quota, 100 per cent of 1940; manufacture has been ordered stopped of harness and saddlery fittings except for draft, work and ranch animals.

Hay Stackers: Under farm machinery quota, 95 per cent of 1940.

Insecticides: Rotenone and pyrethrum have been limited, but in general insecticides are sufficient for farm needs.

Irrigation Equipment: Under quota, 80 per cent of 1940.

Incubators: Under farm machinery quota, 60 to 102 per cent of 1940.

Lumber: Only supplies of softwood lumber available in local yards may be purchased.

Lamps and Lanterns: Individual purchaser can buy without priority. Preference rating required by distributor on his purchases.

Legume Inoculator: Generally available.

Motors: New electric motors almost impossible to get; priority rating required.

Mineral Feeds: Some restrictions; can buy where available.

Mill Feeds: Some restrictions; can buy where available.

Metal Roofing: Restricted to repair and maintenance only.

Manure Spreaders: Under farm machinery quota, 100 per cent of 1940.

Milk Coolers: Stocks frozen; priority rating required.

Metal Canning Jars: Restricted.

Oil: Agricultural fuel oil and lubricating oil not restricted.

Packaging: Paper boxes, bags in good supply. Steel containers restricted.

Paint: Not restricted, but shellac is restricted for military.

Poultry Remedies: Generally available.

Prepared Roofing: Some restrictions, dependent on type.

Pumps: Under farm machinery quota, 90 to 100 per cent of 1940.

Pressure Cooker: Less than 10 per cent of normal available. No priority required.

Pipe: Small pipe, up to 3½-inch, available without priority.

Repair Parts of Machinery: 150 per cent of 1940 production.

Rubber Boots: Not manufactured. Can obtain an A-10 rating if any are in stock.

Roller Bearings: Under priority; available for maintenance and repair.

Spray Materials: Spraying outfits under farm machinery quota, 96 to 103 per cent of 1940.

Silos: Under farm machinery quota, 90 per cent of 1940.

Sodium Chlorate: Available thru agent of Bureau of Mines in each county.

Stoves: Production limited. Obtainable if no other cooking or heating equipment is available.

Salt: No limitation.

Tires: Strictly rationed; recapping of old tires also rationed.

Trucks: Strictly rationed.

Tools: Can be purchased from retailer if supply is on hand; if not, purchaser must await further supply to retailer or apply for preference rating.

Tile: Restricted for bathroom purposes; drain tile available.

Tire Chains: Tire ration boards do not favor use of chains on tires.

Windmills: Under farm machinery quota, 95 per cent of 1940.

Windcharger Electric Equipment: Restricted.

Water Systems: Under farm machinery quota, 49 to 142 per cent of 1940.

Wooden Containers: Adequate. Re-use advisable.

Overalls: Standardization, but no restrictions otherwise.

Easier Cattle Feeding

Condensed from Capper's Farmer

SHORT of help, pressed for greater production, the cattle feeder is on a hot spot. Even at greatly increased wages he is having trouble hiring help. If he gets a man it may take the profit of two to half a dozen steers to pay his monthly wages—and there is no ceiling on wages.

A lot of farm feed yards are obsolete—products of the time when hired help was plentiful and wages low. Feeding in them requires a maximum of physical labor and time.

But there are ways to systematize and mechanize this feeding job to gain efficiency comparable to that of modern methods in crop production. Some farmers have done it. Capper's Farmer offers their ideas and experiences for the benefit of its readers who are struggling with this problem.

There's F. Z. Soukup, Harrison county, Iowa. He built a feeding plant designed for one-man operation. Bunks extend east and west from the center of his barn which shelters pit silos and grain bins. Hay, straw and other roughage is stacked in racks which divide his yard north and south. Grain and silage are distributed by a car which rolls on the bunk edges. He can distribute feed without assistance. In another yard, less well arranged, but of the same capacity, two men are required to do the feeding.

Another Iowa farmer who has no need for team, truck or tractor in his daily feeding chores is John P. Kurt, Dubuque county. Grain grinding and mixing equipment is installed in one side of his corn crib and the prepared ration is spouted from an overhead bin into a track-suspended carrier for distribution to bunks in three paved lots, each of 120 steer capacity. Bunks form a runway for the attendant so he never has to get into the lots in feeding grain. The same carrier and track system is used in distributing the silage from a pair of silos which are located between two lots. The carrier can be spotted under the silo chutes and loaded as silage is thrown down. Each lot is supplied with hayracks which can be filled directly from barn mows. Thus one man can feed the cattle in all lots in the time ordinarily required to hitch up a team, Mr. Kurt says, or 30 minutes twice a day.

Frank J. Luig, Archer county, Texas, has designed a self-feeder

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which he uses for feeding both chopped roughage and silage to beef and dairy cattle. The trough is 5 feet wide and clearance between hopper throat and bottom of the trough is 17 inches. Two he uses outside are 18 feet long, 10 feet high from trough to ridge, roofed with sheet metal mounted on 4 by 6 skids, and movable by tractor. Silage is thrown into the feeder thru a gable door, which also receives the delivery pipe of a grinder when the feeder is to be filled with dry roughage or mixed feed. The feed mill is mounted on skids and is hauled to the feeder site. Such a feeder, he said, had a capacity of about 4,500 pounds ground hegari. It can be used for grain with minor adjustments. One of the big advantages of such a self-feeder in that country is that either silage or ground fodder is protected from wet weather and is thereby preserved. Mr. Luig has built a similar feeder 40 feet long in his dairy barn into which ground forage is blown.

Another Archer county farmer, J. F. Meurer, has one of these feeders with collector installed, ready to attach the feed mill blower. Thru the mill he runs a complete beef ration — shelled corn, protein concentrates and roughage. Capacity of the feeder is about 500 bundles of roughage. Doors are provided for the feed trough which may be closed on the windy or rainy side. Once Mr. Meurer finished 24 big steers on the feeder, and in winter up to 60 cows get their roughage ration from it.

Arrangement rather than unusual equipment is the big labor-saver in Darius Raasch's feed lots, Madison county, Nebraska. His farmstead was planned in 1915 under direction of agricultural engineers from the Nebraska College of Agriculture, and was so arranged that there is no backtracking in doing chores and no gates need be opened in getting to cribs, granaries, haymow or roughage racks from the cattle yards. A well and windmill between house and barn supply water for both cattle and hogs in four feed yards, and for all other lots and pastures adjacent to the farmstead. Hayracks are roofed, a feature which always pays for itself every year in roughage saved.

Elam Suter, who started making baby beef thirty years ago, when the market was afraid of a highly finished yearling, does his winter feeding in a Putnam county, Ohio, covered barnlot. Ingredients of the ration are handily available to a mixing center where the allowance of grain, silage, cottonseed meal, oilmeal and molasses is compounded, and from which it is carted to the sheltered manger, just below the hayrack. Feed is

placed in both from a runway platform.

A. B. Alexander & Son, Knox county, Indiana, mill grain feed into overhead bins from which it runs by gravity into a cart. Over the bunks is a double board walk which serves as a track for the cart and from which feed is dumped. Hay feeders are provided in the center of the barn.

One of Armour Morgan's feeding plants, Vermillion county, Indiana, reduces chore time and costs 75 per cent. The barn is 60 by 90 feet with hay and bedding storage overhead and open-front cattle shed equipped with ceiling-supported, adjustable hayracks. A paved lot, 40 by 110 feet, on the south is bordered with feed bunks far enough from the edge to permit cattle to feed from both sides. A track, supported by steel posts, is suspended over the bunks for distributing grain and silage. It has branches to the silo at one corner of the barn and to the grain bins in the barn. The equipment and arrangement enable 1 man to feed 200 steers in 3½ hours a day, the same time formerly required to feed 50. The plant was designed especially to save labor.

Wheat

Illinois experience in planting fall wheat indicates that, on a three-year average in Jackson County, wheat planted the last week of October yielded as well as that seeded earlier. Four-year tests in Pulaski County show seedings between October 22 and 26 yielded within 1.1 bushels an acre of wheat seeded October 7 to 11.

Seed wheat consisting of kernels smaller than normal—designated, therefore, as lightweight wheat — does not produce as much crop as seed consisting of plump, heavy kernels of the same wheat variety. This was demonstrated in a planting test made at North Dakota Experiment Station comparing lightweight seed and heavyweight wheat at eight different rates of seeding. The latter outyielded the former in six instances with a general average of 10 percent more yield from the heavy, plump seed. The results clearly indicated that heavy-kerneled seed produces the larger yield.

A 24-bushel-an-acre increase in his 1941 wheat crop was Lee Emery's reward for plowing under soybeans and fertilizing for this crop on his Macoupin County, Illinois, farm. Tests conducted in cooperation with the University of Illinois showed a yield of seven bushels on combined-bean land without fertilizer, 15 bushels on combined-bean land.

—*Successful Farming*

The Udder and Mastitis

Condensed from Holstein-Friesian World

Dr. W. E. Petersen

University of Minnesota

THE udder of a cow is the most important unit in agriculture. Nearly one-fifth of the total farm income in the United States is the product of the udder of the cow.

A discussion on the udder of the cow can be divided into three major phases. One is its development, another one is the secretion of the milk within it, and the third, and a very important one, is that of getting the milk out of it.

The development of the udder has come to be better understood in recent years, with the advent of the science of endocrinology. We now know the hormones that are involved in the development of the udder—and that we can now develop the udder on a heifer, and get a fair amount of milk secretion, without her having had a calf.

In general, there are three hormones involved, two of them coming out of the ovary. One of these, estrogen, causes the development of ducts in the gland; the other one, progesterone, comes out of the yellow body of the ovary following pregnancy, develops the secretory cells within the gland. The third hormone is needed to stimulate the udder into milk secretion. It comes from a little gland at the base of the brain which is known as the pituitary, and the hormone is known as prolactin. In small animals, that is, in rats and rabbits, and so on—we can inject these hormones and get apparently a complete development and a complete functioning of the gland. In the cow, experimentation has not been possible until within the last couple of years, as the hormones have been too expensive. But within the last few years, a synthetic "hormone," stilbestrol, has been made available that makes this study possible. As yet we don't know what its practical implications are. I will just give you one example and let you judge for yourselves.

In the University farm herd, we have a two-year-old Jersey heifer that is now milking more than fifteen pounds of milk daily testing six percent as the result of the injection of this substance, which commenced just a little

Reprinted by permission from the Holstein-Friesian World, Aug. 15, 1942

over two months ago. She is still going up in milk production.

The cost of that hormone to date, to get the fifteen pound milk production, is about $1.10. It is too early to predict what the application may be in the case of non-breeding old cows, non-breeding heifers. Just as a matter of information, theoretically, it should be possible to get the bull and the steer into milk. We tried that—but you need not worry about competition from that source. In small laboratory animals, the male can be brought into milk just as well as the female by the application of these hormones. In the bovine it is impossible.

The udder of the cow really consists of four separate glands. Each quarter is an entity to itself, with a separate drainage system for the milk to come out, separate secretory system, and in fact, a separate circulatory system, that is, the arteries divide so that there is one branch supplying each one of these four quarters. On an average, the rear quarters produce sixty per cent of the milk, and the front quarters forty per cent. The rear quarters are therefore half again as large as the front quarters. They get this size, in spite of the fact that the rear quarters are narrower, from being deeper and encroaching upon the territory, so to speak, of the front quarters. In other words, I defy any judge to be able to tell from appearance or palpation the relative size of the front and rear quarters. I have seen rear quarters which, along the middle, have extended to the front of the udder, or they may encroach very materially upon the area that apparently should be reserved for the front quarters.

The udder has a tremondous circulation. We have measured the blood flow to the udder or the cow by fistulating, or getting into the artery, injecting a dye into that artery at a constant rate over a period of thirty seconds, taking the blood from the veins as it comes out of the udder, and measuring the dilution of the dye in the blood that came out. Then we could calculate how much blood went through that udder in thirty seconds. Knowing the amount of milk that the cow produces, we could easily relate the ratio of blood to the amount of milk. And this is the astounding fact: that about four hundred pounds of blood go through the udder for every pound of milk that is produced.

Let's take an ordinary Holstein cow that produces fifty pounds of milk a day. She pumps ten tons of blood through that udder for the making of that milk. We know the pressure on the arterial side, so we can calculate the amount of work that is actually

done—and only by the left side of the heart—in pumping this blood through the udder, and that is equivalent to loading on ten tons of manure onto a spreader that is about 47 inches high.

And that is just the blood that goes through the udder, to say nothing about the additional blood that the milking cow pumps through the other vital organs—the digestive tract, and other organs that are greatly increased in activity as a result of lactation. Nor does it take into account at all the work of the right side of the heart that must pump this blood through the lung.

A number of years ago, we took the udders off cows at milking time. That is, we slaughtered them first, and took the udders off and analyzed them for the milk that they contained. We found that these udders contained all of the milk that we calculated the cow would have produced if she had been milked before slaughter, which, of course, showed that the old idea that milk was secreted mainly at the time that you sat down to milk was wrong. You will recall that that was the prevalent idea, and it is still prevalent in many places.

So we set up another series of experiments to show that the milk is secreted uniformly in the interim between milkings, provided that the cow doesn't milk too much. If she is a heavy producer the rate then slows up toward milking time and is slowest, or even may be completely stopped, at the milking time. We studied the pressures that develop and the relationship between the pressures within the udder and the rate of secretion. As milk accumulates within the secretory recesses, of which there are many millions in the udder of a cow, a pressure develops, and when that pressure gets up to approximately one-fourth that of the blood pressure, then milk secretion stops, and as the pressure develops the rate of secretion is slowed down. Milk secretion is most rapid when there is no pressure within the gland, and it is completely stopped when the pressure reaches approximately one-quarter that of the blood pressure. When that happens the milk starts going the other way, that is, resorption begins. At this time milk begins to come into equilibrium with the blood. Milk is not normally in equilibrium with the blood. But when the pressure gets up to one-fourth that of blood pressure, some of the constituents of the milk go back into the blood and are exchanged for substances that go from the blood into the milk, until finally they come into equilibrium.

The best example of milk that has come into equilibrium is colostrum milk, the first milk after calving. It is low in milk sugar, high in salt, low in the casein — the characteristic protein of milk — it is high in the proteins of the blood — globulin and albumen — and it is high in cell content. It has the characteristics of mastitis milk — and, of course, the characteristics of mastitis milk are those of milk that has come into equilibrium with the blood.

Let us begin with an udder that is full of milk. Most of the milk is stored in the tiny little recesses in which it is secreted. Some of it, to be true, drains on down into the cistern in the lower part of the gland but that is a very small proportion of the total amount of milk that there is in the udder. Each of these little recesses contain but a fraction of a drop of milk. They may be likened to an eye-dropper that is filled with fluid which will not come out until a force is applied to the rubber bulb. The amount of the milk within each little recess, that we call an alveolus (alveoli, for plural) is so small that it cannot drain out by its own weight and consequently, to get that milk out, we must have a force applied that will squeeze it out, just the same as fluid is squeezed out of the eye dropper. It has been shown that around these alveoli there are tiny muscle cells that are capable of contracting to do the squeezing.

At this point I am going to tell you briefly how we discovered the complicated phenomena involved in getting milk out of the udder but before doing so let me tell you many cows are poor milkers, because they are not milked completely, or some of them do not know how to respond to the milking act and let it down completely. When there is this pressure built up in the gland, and milk starts to be resorbed, the cells start to disappear, and the drying off process starts.

The reason that cows milk more on three-time milking than they do on two-time milking is due to reducing the pressure and stimulating the rate of secretion; and the same thing happens for four-time milking over three-time milking. The pressures, you see, are kept at a minimum, at the more frequent milkings per day.

Now, then, for the nature of this phenomenon. First we thought that the cow controlled the letting down of milk through her voluntary nervous system, and could decide whether or not she would send a message down to squeeze out the milk. We soon found this not to be so, for when we cut the nerve that goes down to the mammary gland so that

no message could be sent down that way—there was no difference in the amount of milk that the cow let down at a milking, nor did it make any difference upon the effect of the completeness of milking, provided that the conditions were right.

So the next thing that we did was to speculate on what might be the mechanism—and anybody working in the field of physiology who doesn't suspect hormones as being responsible for a phenomenon certainly would be accused of not knowing his field. We suspected that it would be a hormone, and we injected the hormones that we thought might be responsible, and we found that it is a pituitary hormone that causes the let-down of milk. First we demonstrated that this hormone would do the job as when we injected this pituitary hormone, known as oxytocin—into the jugular vein at the junction of the head and neck—it took about forty seconds until the teats became distended, and the milk was let down.

That experiment, of course, did not prove that that is what happens when you sit down to milk a cow, so we set up another series of experiments and just recently reported on the result. In our laboratory, we have what is known as the mechanical cow. We didn't give it this name, and you needn't worry about its being a competitive factor to the real cow. It consists essentially of an artificial heart, artificial lungs, onto which is hooked up the udder of a cow that has come from a packing plant, and the blood from that cow is then circulated through that udder. By means of this setup we can study the making of milk. We can make additions to the blood, and we have even made synthetic blood.

We put teat tubes into the udder immediately after we hook it up, and drain the milk out. Then we inject the hormone to force out any milk that is left in these tiny recesses and then at the end of the experiment, six or eight hours later, we inject the hormone again and we get the milk that was made during the experiment. Sometimes we don't, but in the majority of cases we do.

In this particular experiment, we didn't inject the hormone, but went down to the barn and stimulated a cow to let down her milk, and then, instead of milking her, took out a quart of blood. Then we put this blood through the udder and with these teat tubes in position we could tell what effect it had upon the let-down of milk. The blood from the stimulated cow caused a let-down of milk, proving that the substance that is responsible for the let-down of milk is in the blood. When we used blood from

a cow that had not been stimulated to let down the milk, there was no effect on this udder that is off the cow.

We had an accident, which was quite revealing. One of the boys went down to get some blood from a cow, and chose an Ayrshire, who resented the idea so vigorously and so successfully that only half the amount of blood called for was obtained before she broke the halter. But we put that in anyway, and in this particular experiment, there were 1,080 cc. of blood that went through that gland per minute, and after putting through 500 cc. of that blood from the excited cow, the blood flow dropped down to just over a bit over 200 cc. per minute.

Do you see how that ties up with the gentleness of handling cows? Excited cows secrete a substance into the blood that constricts the blood vessels in the udder.

We set up another series of experiments in which we tried out nine different drugs upon the rate of blood flow and the let-down of milk in the cow's udder. We found that the cow's udder is unusually susceptible to the effects of those substances which constrict the blood vessels. In the case of excitement, there is the characteristic response.

Well, you can see that this ties in with an old idea that we have, that we must not excite milking cows, for upon excitement, out go these substances that constrict blood vessels, shutting off blood to the udder, lowering milk production. But that isn't the worst of it. I shall tell you our worst place for fright and excitement. In these experiments, we found that when we injected the hormone and then took a little too long a time to milk, we didn't get all the milk out. Or, in other words, this hormone lasts but a short time after it is injected into the bloodstream; or if we let this blood set for a few minutes after it has been taken out of the cow, then it has no effect upon the udder that we run it through. The blood destroys this hormone rapidly.

What does this mean in the way of milking? It tells us this: that we must get the milk out of a cow rapidly; if we are going to have complete milking. To prove this we set up a series of experiments to test it out in practice. One was to wash the cow's udder twenty minutes before milking was started—and if you want to ruin milk production, that's a good way to do it. Washing a cow's udder is the stimulus to let down the milk. The teats become distended to indicate that the milk has been let down. When milking began some time after, it is too late to get the full benefit of the hormone, and the

milking was incomplete. Pressure is built up within the udder, the resorbing process starts in, and the drying off process begins. Many a short-time cow, in my opinion, can be explained upon the basis of incomplete milking.

Another experiment was to milk one quarter at a time, going around the cow's udder, milking each one dry, and at the end of it, injecting the hormone and forcing out the milk that was left in there. Here is essentially what it is, in round numbers: first quarter, 100 per cent; second, 90; the next, 80; the next, 70. A progressively less per cent of the milk was gotten out by that sequence of milking. So speed in milking, you see, is very important.

Then another series of experiments was set up, to test the effect of excitation of the cow, as it is well known that when cows are excited, they don't milk well. Dr. Ely worked out this particular experiment that I am going to tell you about. In experimental work, you have got to have things down so that you can quantitate them, so that you can say that there are so many units of this or that applied. So he standardized fright by appealing to three senses. One was pain. For this he put a kitten on the back of a cow just before the milking process started. The kitten anchored, the cow moved, and the kitten anchored more, and so it became a vicious circle.

Another one was the appeal to the ear, the auditory nerve, and in that he devised the explosion of inflated paper bags every twenty seconds. The cow is exceedingly responsive to anything that she can hear. Explode a paper bag, or merely clap your hands and see the whole line of cows quiver in response.

Then he appealed to the eye, or perhaps the nose—the olfactory nerve—I don't know which. A cage of rats was placed in the manger. A milking machine was put on, hooked onto the bucket that was suspended to a scale, where the weight of the milk was recorded. What happened? When the milking machine was put on, he got a little milk at the beginning—that which was down in the teats and in the lower cistern. Then no more milk came as long as the cow was excited. The longest period that he used was forty-two minutes. Then he injected the hormone and in two to three minutes all that milk was out of the udder.

So, then, you can see that type of extreme excitement has a profound effect, causing complete inhibition of the let-down of milk.

We tried another experiment that we interpret as a state of anxiety. We put a feed cart in the alley, filled with feed, that the cow could see but could not reach.

The response was not so dramatic as it was with this one of Dr. Ely's, but it was quite good. We didn't get all the milk out and what we got came slowly over a long time. This experiment shows another thing, that you can get a partial inhibition. It need not be complete; it can be partial.

Now, what is the mechanism, what stimulates the let-down of this hormone? Nerves are involved, yes. But not the nerves that we thought, that is, the nerves that carry messages from the brain on down. They are nerves that carry messages from the outside on up to brain. When we cut these nerves going down to the udder, we did not cut the sensory nerves, pain nerves, cold nerves, hot nerves or touch nerves in the skin of the udder and the teat. They come down through the outside from the spinal column, right under the skin, to enervate the gland. So the cow had all of these sensory nerves in the udder. What happens? The milking stimulus sends a message on up to the brain, and from the brain to the pituitary, and out goes this hormone, and that is the mechanism, we believe, that is involved. If we block out the sensory nerves by anesthetizing we can't get any milk out of the cow. But it is there, as when we injected the hormone, the milk was let down.

This brings us to a consideration of good milking. First, milk fast. The faster a cow is milked, the better, and I believe that we can, at least with machine milking, milk cows in two and a half or three minutes, and it is possible to train most cows, if not all of them, to let down their milk in that time. I had reported to me that one milker in one large herd in the United States, operating three units of a milking machine, was milking an average of one cow per minute—sixty cows an hour—and he was getting more milk and having less udder troubles than he had ever had before. Rapid milking is essential to get the full effect of this hormone.

Next comes the problem of getting a sudden and a complete release of the hormone into the blood stream as the result of the milking act. This necessitates that there be no exciting circumstances around the barn at milking time. It is also necessary that the man who does the milking, whether by hand or by machine, must be one that the cow has confidence in. In my opinion, there are many people who cannot milk efficiently because they cannot elicit the proper response from the cow. There is something about their mannerisms that arouses suspicion on the part of the cow, and when that happens, there cannot be a complete re-

sponse to the milking act.

Cows, too, by poor milking technique, will develop poor milking habits. It is easy to make a stripper out of a cow by poor milking habits. Simply take your time about milking, and the cow is exceedingly accommodating. She will let down the milk a little slower than even the slowest desire it to come.

There must be no strange noises or anything strange to the cow during milking. The cow is quite a curious creature—at least most of them are. I have had reported to me and have observed that cows that have been out and then come back in and find that their stalls have been painted have been more interested in inspecting the paint job than in responding to the milking stimulus.

There is another very important phenomenon to consider and that is a condition reflex. That is, cows may be conditioned to respond to other things than the milking act to let down milk. When grain is fed immediately before milking for a period of time, the cows associate the feeding of the grain with the milking act and let down the milk to the grain feeding. In almost any herd you can find cows that respond to the let-down of milk when they hear the milking machine started or the rattling of the milking utensils. Look on down the string in almost any herd and if there are any easy-milking cows, you will see milk streaming from the teats after milking begins. This is evidence that the milk has been let down and a pressure has been built up in the lower cisterns. Good herd management dictates finding such cows and milking them first.

So anything that happens around the barn before milking time very easily may be associated with the milking act by the cow, and she may respond to that by the let-down of milk — and that's a thing to be avoided. We just concluded one experiment in which we fed grain immediately before we milked each cow. I am not so sure that isn't a good practice except that some cows become so excited waiting and fighting for the grain that it offsets any good that might come from preventing the let down of milk in advance of milking. We got some evidence that a lot of cows, at least, when they are waiting for their grain, will not respond to the let-down of milk, and then when you give them the grain, there is a response.

Anyway, in milking with machine, I think it is important that the cow's udder be massaged for three-quarters to half a minute before the machine is put on, so that the milk is let down, and then, with easy-milking cows, all of the milk can come out in two

and a half minutes, when the cows are properly trained. With the some twenty-three million cows that I estimate are being milked today, you could save three minutes per cow per milking, or six minutes a day per cow. Calculate yourself how many million man days could be saved by training cows to milk properly, in the United States—and then get better results, by far. I am confident that if these simple rules that I have given relative to milking were adopted by all of our milkers in the United States, all of the increase for dairy production this year could be attained more than once over, from just that simple expedient.

Save Old Paint Brushes

With good paint brushes difficult to obtain new because of war conditions, it's wise to reclaim old brushes, suggests J. C. Wooley of the University of Missouri College of Agriculture. This can be done even with brushes that are "stiff as a board" if the bristles have not been broken.

A good way to soften stiff brushes is to soak them overnight in paint remover. If they are not too hard, gasoline or turpentine may soften them sufficiently. After the old paint has softened, it can be scraped off with a putty knife or combed out with a steel comb or brush. If this doesn't remove all the paint the treatment may be repeated.

After the worst of the accumulation is cleaned out, the brush is washed in warm water with a mild laundry soap. The excess water is shaken from the brush and it is dried for a while in the air. Then, the bristles are straightened with a scrub brush or comb and the brush is wrapped in heavy paper or cardboard to permit thorough drying and to keep the bristles straight. It's wise to avoid dipping the brush in paint again before being fully dried, as the trapped moisture will make the bristles soft and lifeless.

When a brush is being used every day, it can be kept in good condition by filling it with paint and wrapping it overnight in several thicknesses of paper, or by suspending it in a can of water. If the brush is used every few days, it can be suspended in raw linseed oil or kerosene.

When painting is finished, clean the brush, dry thoroughly, and store with bristles straight.

—*Missouri Farm News*

What "Vets" Talk About

Condensed from Missouri Ruralist

TALKING shop among themselves, delegates to the American Veterinary Medical Association convention, recently held in Chicago, told some mighty interesting things. The following paragraphs were taken from talks by top-notchers on the program:

It has been shown that watering dairy cows twice daily produces 7 per cent more milk than watering them once a day.

Benefits in better livestock health and production which are gained from proper watering practices are equally significant with respect to proper feeding practices.

Scientific rations should include proteins, carbohydrates, fats, minerals, and vitamins. Proteins repair tissues and build new ones. Carbohydrates are the preferred body foods for muscular energy. Fats are carriers of valuable vitamins, and provide a source of energy 2½ times that of carbohydrates and vitamins. Minerals are essential to the vital processes of the body, and are important to the skeletal structure, the nervous system and blood. Vitamins are essential to maintenance, growth, health and reproduction.

It is not sufficient, however, to merely have these various ingredients in a ration. Quality of the ingredients is an important factor. For example, in a carefully controlled feeding experiment, pigs from the same litter were divided into two groups, and received rations of the same formula and chemical analysis. At the end of the 20-week experiment, the pigs in one group weighed an average of 21 pounds more than the other. The difference was due to the quality of the ingredients. Similar tests have been conducted with chickens and turkeys, and the differences were equally significant.

Feeder Gains Speed-Up

A new method of stimulating more gains in feeder cattle, by partial removal of the thyroid, was reported. In a series of tests with 12 steers, those which had the thyroid removed began to gain weight 33 per cent faster than those which did not have the operation.

The average daily gain during the first 6 post-recovery weeks was 2.6 pounds in the operated steer, in contrast to an average daily gain of 1.8 pounds in a group of 17 control steers which were not operated. Following the sixth week the rate of gain was reduced, and averaged 2 pounds

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daily at the 20th week. The animals on which the tests were conducted ranged in weight from 365 to 993 pounds at the time of operation.

Would Cook the Garbage

Feeding uncooked garbage to hogs is the greatest factor today in spreading trichinosis in this country. The incidence of trichinosis in hogs fed uncooked garbage is 5 times higher than in grain-fed hogs. It was proposed to place feeding of garbage under the control of state livestock sanitary authorities; requiring a state permit to feed garbage to hogs; automatically quarantining hogs fed on uncooked garbage; requiring a permit before such hogs are sold; requiring a permanent identification tattoo on all hogs admitted to plants where uncooked garbage is fed; requiring slaughterhouses using such hogs to pre-cook the meat before selling it to retailers.

Trichinae in pork are killed when all parts are heated to 137 degrees Fahrenheit, a lower temperature than that at which milk ordinarily is pasteurized. In the interests of public health, it is not unreasonable to demand that commercial feeders subject garbage to such temperatures before giving it to hogs. Canada has such restrictions.

Very Tough Roughage

Every kind of object from money to razor blades has been found in a cow's stomach. Recently one veterinarian removed 11 razor blades and a rubber ball from one cow. In his opinion more than 75 per cent of all dairy cows over 5 years old are suffering from this condition. Cows have a curious tendency to swallow bright or shiny objects lying around the barnyard. These include nails and pieces of glass. If every farmer would pick up such objects, he could prevent the loss of many valuable animale.

Sharp objects, such as nails and needles penetrate the stomach and go toward the apex of the heart, and when they reach the heart they kill the cow.

Where digestive disturbances created by such objects are noted in time, they can be removed by surgery. Usual symptoms show the animal "off feed," eating best every two days or three days. When going down hill there is a distinct grunt.

Poor Feed From Poor Land

Many digestive disturbances in cattle are caused by lack of minerals which are essential to health and growth.

Food crops grown on run-down or mineral deficient soil are bound to be lacking in essential minerals. If those minerals are not added to the rations in one form or another, the livestock will suffer from deficiencies—such deficiencies are responsible for more

digestive disorders in livestock than the public realizes.

Horses Rescue the Lambs

Old Dobbin has come to the rescue, to help save the lives of thousands of lambs affected by "pulpy kidney disease." A new type of serum produced by inoculating horses is now being used successfully in Oregon in combating the disease.

Lambs from 2 weeks to several months old, on luxuriant pasture or heavy grain ration, are usually affected by the disease. Death occurs within a few minutes and up to 4 hours after symptoms appear, and mortality approaches 100 per cent. In tests made, antisera was produced by 7 ranch horses. Losses in flocks of lambs this year stopped immediately following the use of the serum. In the previous year's tests 4.53 per cent of the untreated lambs died of the disease, while only .23 per cent of the treated lambs died.

How modern veterinary science is attacking a new disease which is causing heavy losses to cattle raisers in Oklahoma and other beef-producing regions, was described. The disease, "idiopathic hemoglobinemia," is similar to "red water" disease, but is a different pathological entity.

The death rate from this disease among several thousand head of Oklahoma beef cattle was about 100 per cent among untreated animals. All attempts to isolate a causative pathogen, or to reproduce the disease in common laboratory animals and cattle, have been unsuccessful. Best results thus far in treating sick animals have been obtained by using an intravenous injection of a compound arsenic solution.

Are Fighting Mastitis

A new method of attack against mastitis was reported. The new treatment involves use of iodine in mineral oil. The iodized oil is injected into the udder and milk cistern of the cow while she is dry, and is generally allowed to remain there thru the "dry period."

However, the mere treatment of mastitis cases as they arise will not eradicate the infection within a herd. Presence of the disease in a herd indicates that unknown infections exist in cows which are not suspected of harboring the disease. Mastitis eradication requires thorough diagnosis, classification of all animals in the herd, proper management, and proper treatment of infected animals.

To Keep Horses Awake

Further progress is being made in the nation's fight to reduce horse losses caused by sleeping sickness. The new, improved vaccine made from the embryos of unhatched chicks, is providing greater immunity to sleeping sick-

ness, and the protection is effective for longer periods.

Tests conducted on horses immunized by both subcutaneous and intradermal vaccination, showed that full immunity was provided for 8 months, and that immunity still persisted at 13 months, altho it appeared to be waning somewhat at the later date.

Sleeping sickness among horses has shown sharp increases in the last few years, and authorities have been fearful of a recurrence of the devastating losses which occurred a few years ago. The army has already had all of its horses vaccinated by veterinarians, to protect them against the disease, and annual vaccination is now becoming a regular practice among many horse owners.

Aid for Dairy Cows

Concerted effort which leaders in veterinary research are making to discover methods to combat the growing menace of mastitis, which is ruining so many thousands of valuable dairy cows in this country each year, was described before the association.

In an attempt to determine the value of chemotherapy in treating the disease, which ruins the udders of dairy cows, 3 research veterinarians treated 308 quarters with such agents as acriflavine, entozon, colloidal silver oxide, and tyrothricin. Cows which were lactating, and others which were "dry" were treated.

In the lactating quarters, acriflavine was found to have 89.3 efficiency in destroying streptococcal infections, entozon 60 per cent, colloidal silver oxide 71.4 per cent, and tyrothricin 51.4 per cent. In dry quarters the efficiency of acriflavine was 71.4 per cent, entozon 72.7 per cent, colloidal silver oxide 69.9 per cent, and tyrothricin 92.1 per cent.

Altho response of the infected quarters to acriflavine and entozon is comparable in efficiency to other agents used, tissue irritation, damage to the udder and lowered milk production appear to be greater. Tyrothricin was apparently the least irritating of any of the products used.

One Disease Brings Others

A little-known malady, Johne's disease, which is caused by an organism resembling the tubercle bacillus, is now believed to be a predisposing factor in producing many other disease conditions in cattle and sheep.

The disease seems to affect virtually all farm animals, and is difficult to eradicate where various types of livestock run together. In a checkup of 10 typical counties in Arkansas, 355 cattle, 376 sheep, 63 goats, 24 swine, 35 horses, and 44 mules were found to be affected.

A program for control of Johne's disease in cattle would be of little or no value unless

consideration were given to other species of animals maintained on the same premises. Swine reacting to "johnin" have always been found associated in the same lots with cattle or sheep.

The disease principally manifests itself in a disturbance of the digestive tract, and a pronounced emaciation of the affected animal. Veterinary leaders believe it to be much more widespread than is generally recognized, and that it may be responsible for much livestock illness which is now ascribed to other causes.

"Sulfa" Drugs a Big Help

The "sulfa" drugs which have produced such amazing results in coping with various human diseases, are proving equally beneficial in dealing with livestock diseases.

Veterinary delegates were told that sulfaguanidine had proved of definite value in treating necrotic enteritis in swine. This disease, known as "necro" to most farmers, has ranked as one of the major causes of swine losses in this country for a number of years, and has been a complicating factor in other swine diseases.

Twelve lots of pigs afflicted with enteritis were treated with sulfaguanidine in co-operation with local practicing veterinarians, and results indicate that sulfaguanidine possesses considerable merit as a therapeutic agent in the treatment of the infectious enteric complex. Among the treated animals 69 per cent recovered, while among the animals not treated only 16 per cent recovered.

In another test lot of 133 affected pigs treated with sulfaguanidine, 92 per cent recovered.

Force Even Grazing

Dairy cows are not interested in going farther than necessary to get what grass they want. That kept W. R. Joslin and Son from getting full benefit of their pastures before electric fence was used. When grass was growing rapidly in spring the herd could fill up without going to far corners of the pasture. Grass there got hard and was less palatable than second growth of cropped grass. Now the mixture of red clover, timothy, alfalfa and sweet clover is divided into 6 tracts, which are grazed in rotation. In years when grass makes big growth, part of the tracts can be harvested for hay, then grazed later. The Joslins, who farm in Shelby County, Ohio, feel that is run short on pasture from July a cheap way to get maximum production from the land, yet not till frost.

—*Capper's Farmer*

Fall Chicks

Condensed from Poultry Tribune

J. H. Florea

MANY poultrymen have learned that the best way to increase the year's production of eggs is not to overcrowd the laying houses at any one time, but to keep the houses filled to the proper capacity thruout the year by hatching "out-of-season" chicks.

Thus a brood of chicks started in September, October or November will come into production about March or April, when the spring-hatched flock has been thinned out somewhat by mortality and culling. These fall-hatched pullets coming into production at that season of the year lay well on through the summer and late into the fall, thus helping to maintain an even flow of eggs throughout the year.

This management practice not only helps to increase the supply of eggs to meet our wartime needs, but, by making more efficient use of buildings and equipment, it increases profit to the poultryman. It also distributes the labor of brooding over a longer period, rather than concentrating it all in a few spring months.

Fall chicks may be a little more expensive to brood than spring chicks but the advantages listed above, plus the fact that in the heavy breeds, at least, a higher price generally is obtained for broilers, fryers and roasters started in the fall, help to overcome the added cost of brooding.

Management of fall chicks need be very little different from that of spring chicks. They feather quickly and heat is seldom needed after eight weeks. Start them with about 200 chicks in a 10 by 12 ft. house, and leave them there throughout the winter, taking out the cockerels for broilers. Let the chicks run out on the ground as much as they will all winter.

If it is customary to vaccinate for fowl pox on the farm, vaccinate these fall-hatched pullets at the usual time—about 12 to 16 weeks of age.

Because there may be some tendency for them to mature slightly faster, fall-hatched pullets may be a little smaller when they come into production, but by the time they are a year old there will be little or no difference in the weights of fall-hatched and spring-hatched pullets. Egg

Reprinted by permission from the Poultry Tribune, Mt. Morris, Illinois, Sept., 1942

size may be a little smaller at first, but the pullet eggs will be produced at a time when there is less difference in the price of pullet and large eggs.

The fall-hatched pullets will lay later into the fall before molting and many of them will lay right on through the winter without undergoing a fall molt.

Figure out about how many pullets you usually could house without crowding along about April, then order the right number of chicks to produce them. Clean out, scrub, and disinfect your brooder houses and equipment and start the chicks just as you would in the spring.

If your experience is the same as that of most poultrymen who start fall chicks, it will be a pleasant one. There will be fewer chicks to start next spring and you will have a steady flow of eggs throughout next summer and fall.

A New Fungicide

A new fungicide that sticks better than sulfur and is twice as toxic to fungous spores is reported from the Geneva Experiment Station in New York. It is ferric dimethyl dithiocarbamate. In a scabby McIntosh orchard at 2-100 it gave as good control as the best dry wettable sulfur at 5-100. When it was used in the cover sprays only it held scabby fruit to less than 1 percent, and was as effective as flotation paste at 6-100. In another test, it was used on Baldwins with oil and fixed nicotine without causing injury.

Tested for cedar rust, it gave perfect control when used at 1-200 in 5 sprays—pink, bloom, calyx, first and second covers. It also proved effective for dry rot of sweet cherries. Used at 1-200 with a half pint of cottonseed oil as spreader it left no residue and protected fruit from decay several days after harvest under conditions favorable to rot development. In another case, where it was used at 1-100 with cottonseed oil spreader 2 weeks before cherries were picked it gave complete protection, altho 4 inches of rain fell in the 2 weeks. If future check tests prove as favorable as those completed the product will be made available in quantities under a trade name.

—Capper's Farmer

Building a Foundation Herd in Jerseys for Lifetime Production

Robert C. Arms

Burlington, Vt. — Prize Essay Winner

MY ambition is to breed a cow *family* that will be noted for *lifetime* production. Why waste good grain and roughage, in a time of national emergency, by raising heifers that will soon burn themselves out and become non-breeders?

Six years ago my first 4-H project *had* to be dairying, because there have been Jerseys on this Winooski Valley farm for very nearly seventy years. The family is Jersey minded, but we milk both grades and purebreds, and there has been little design in the selection of herd sires.

My father's breeding program "clicked" only when it came to daughters of an old imported-in-dam bull Diamond's Napoleon 120638. For years, our family expeditions were to border farms in Canada, where daughters of this bull could be seen and possibly bought at a bargain.

Those old Diamond cows were large and rugged, with straight backs, level udders having big well-placed teats, and every sign of good dairy temperament. From them I learned to judge a good Jersey cow, and they taught me that a bull is more than half the herd. It *had* to be a pretty good bull to improve on those old matrons, alike as peas in a pod.

When we started out to buy my first heifer calf in 4-H, we went to Canada. Our home is not far from the line, and, on one of those border roads, there is a sign posted each spring:

"Be Careful of the Rut You Take—
You Will Be in It a Long Time!"

My father laughed. He said, "You want to be careful starting out to be a dairyman. A farmer has to be just as careful of the cows he milks, as I do of the rut I take here, because he will be with them a long time—or else they'll put him out of business in a short time."

Then he said something else. "Don't forget that the main thing in a cow is her ability to produce and reproduce. You take a cow — she has to calve regularly if she's to make you any

money. The old grandmas in any herd are the ones likely to have proven top investments."

I was spending my own money, however, and my first heifer calf was an imported-in-dam daughter of a cow that had been champion at one of the province shows and had had one outstanding record. My calf was a show prospect, but she never amounted to much. She took a few prizes in the local show, reached the Jersey regional as a senior yearling, and died one month after her first calf was born. Too late, I looked up the record of her sire and dam. The sire, too, had lacked stamina and had left only two or three good daughters behind him.

That year I won ten dollars for showmanship at Essex Fair, and Dad said I could buy any calf in the barn. I looked the *old* cows all over—not so much for type, as to find out if they milked well and had calved regularly. A half dozen of the older matrons I card indexed from herd records.

Four out of six of these older cows were Diamond daughters. Old Diamond at seventeen was in service in our herd. The other two cows were daughters of Sayda's King of Meridale, who sired calves in Vermont until he was sixteen. Our herd records showed that daughters of these two old bulls had one quality in common—barring accidents they lived to a ripe old age, producing and reproducing each year.

The calf I chose was Intervale Valiant Dossie 1160005, by Samares Valiant Prince 372005, a good son of the Island bull Samares Cute Prince. Her dam, Ivadale Dossie 822981, a Diamond daughter, has a R. of M. record of 12,208 lbs. milk, 661.82 lbs. fat, in 365 days, made when eleven. Ivadale Dossie's first officially tested daughter, Intervale's Forward Dossie 980503, has a Gold Medal Record of 13,387 lbs. milk, 701.93 lbs. fat, age six. This daughter, now nine years old, is still in the herd and producing.

It wasn't this one Gold Medal daughter that impressed me. It was the fact that all other daughters and grand-daughters of old Dossie showed signs of being able to hold their own for a long time. It is the same with dairy cattle as it is with humans. Certain families of people live to a ripe old age; so do certain families of cows. Longevity is an inherited factor.

Just to show that a cow having a modest milk record year after year may be a profit-maker, the actual card record of Ivadale Dossie is given. She made 94,629 lbs. milk, 4,992 lbs. fat, actual poundage, in eleven lactations—value $3,075.44.

Valiant Dossie freshened on Christmas Day, 1939, her gift to

	Days		Milk	Fat
1931	305		6,283	332
1932	305		6,509	404
1933	305		7,575	376
1934	305		7,249	390
1935	305		8,407	452
1936	305		8,962	470
1937	267		7,837	383
1938	305		10,474	571
1939	365	(R. of M.)	12,208	662 (R.)
1940	305		9,770	487
1941	305		9,355	465
			94,629	4,992

our herd being a fine bull calf by Intervale Fair Promise Lad 403333, a home-bred bull. We named the calf Intervale Yuletide Valiant 406531, and both mother and calf were first prize winners at the Champlain Valley Exposition, 1940 and 1941.

Intervale Valiant Dossie 1160-005 has completed a two-year-old D.H.I.A. record of 6,932 lbs. milk, 328 lbs. fat on twice-a-day milking, profit above feed cost, $152.35. She has just had a heifer calf and I am going to put her on R. of M. test this month.

With money from a garden project and fair premiums, I bought old Dossie's next heifer calf, Intervale Valiant Dorcie 1219966. She is now milking, and I have her in D.H.I.A. testing.

In 1939, I bought Forward Dossie's grand-daughter, Intervale Valia Dossie 1249324. She will soon freshen.

Now I own three heifers that are direct descendants of Ivadale Dossie. I plan to breed the two youngest to Yuletide Valiant, believing this inbreeding will fix family characteristics.

This plan is based on a study of the original importation of Jerseys on this farm in 1873. They were sent to Peter Leclair, Winooski lawyer, and included Stoke Pogis 1259, and the three cows Matilda 3238, Marjoram 3239, and Violet 3d 3240. From these four registered Jerseys came foundation animals worth thousands of dollars, which gives me courage to try similar methods.

Mr. Leclair's Jerseys were inbred descendants of the bull Pope 652, owned by Philip Dauncey of Norwood, England. Mr. Dauncey used Pope from 1826 to 1841, then he bred sons of Pope to daughters of Pope for many years. He would have nothing but grays, and insisted on cows of good size and level backs.

The President's Cup of the American Jersey Cattle Club has been won seven times out of ten by direct descendants of Leclair Jerseys.

	Lbs. Fat
1923—Darling's Jolly Lassie 435948	1,141
1924—Madeline of Hillside 389336	1,044
1926—Killingly Torono Lass 508624	882
1929—The Lion's Lilac 671092	926
1931—Rinda Rosaire's Tessie 725083	1,042.81
1934—Stockwell's April Pogis	1,218
1935—Stockwell's April Pogis	1,037

Lifetime producers among Pope's descendants include Sophie 19th of Hood Farm and her son, Pogis 99th of Hood Farm, with 121 tested daughters. Pope's blood tells today in many well-known Jersey herds — at Randleigh Farm, Lockport, N. Y., where Randleigh Farm Pogis is a Superior Sire; at High Lawn Farm, Lenox, Mass., where we find Lilac's Remus, Superior, Gold and Silver Medal sire; and with Iliff's Lilac's Sir Dustan 356910, in Oregon.

The choice of another bull to use on my Dossie Heifers is important. Daughters of Sayda's King of Meridale were a large part of the foundation of Mr. Brigham's famous herd of over 100 Jerseys at St. Albans, Vt. The daughters of this bull I mentioned previously as being long-lived in our own herd. Of the 28 heifers Mr. Brigham is raising in 1942, sixteen trace back to Sayda's King of Meridale, four of these to the same cow Desdamona 88.

Five of the seven sires used in the Brigham herd have been Pope descendants—Killingly Torono Lass Lad, Josephine Royal King, Smoky Pure Gold Duke, Floss Duke's Model, and Lilac Remus Unrivalled.

Among the old cows in Mr. Brigham's herd, Killingly Torono Lass Lad's Nerissa 1000269 had five D.H.I.A. records as follows:

Fresh	Days	Milk	Fat
7/17/35	335	7,739	435
12/2/36	335	9,672	506
1/20/38	340	12,167	646
3/10/39	286	11,479	599
4/28/40	303	11,284	588

Nerissa's four daughters in the herd by three different sires all have excellent D.H.I.A. records and show good dairy type. A bull from this cow will help me tie up my breeding program, and I should like the sire to be Lilac Remus Unrivalled.

Just as a matter of national defense, it would seem that dairymen everywhere should give more consideration to the long-time production of their dairy cows.

Britain's Wartime Farming

Condensed from New England Homestead

J. A. Scott Watson

Agricultural Attache, British Embassy

ABOUT 1790, when Britain's population had grown to around 13 million, she ceased to be able to feed all her people from her own soil. Since those days, of course, her farmers have got to know a whole lot about producing better crops and livestock. But in the meanwhile population has grown to 47 millions. Moreover, standards of living have greatly changed. Modern consumers, in time of peace, were no longer content to live on cheap and easily produced foods like oatmeal, potatoes and bread. They wanted more milk and dairy products, more meat, fruit, eggs and choice vegetables, all of which commodities require more land for their production than the old staples.

At the outbreak of the present war Britain was producing, from her own soil, little more than one-third of the food she consumed. She was importing something near two-thirds, mostly in the form of actual human food but quite largely in that of animal feeds, which were converted into eggs, bacon and milk by British farmers. This degree of dependence on food imports was not surprising if we remember the small area of Britain's farm lands. In fact the amount of land per head of population in 1939 was only a quarter of an acre of crops, about three-eighths of an acre of improved pasture and around a third of an acre of poor mountain and moorland grazing.

Both Napoleon and the German Kaiser, in their wars, tried to defeat Britain by starving her out. Both succeeded in making things difficult. In the years around 1810, when an able-bodied man could earn around 30 cents a day, wheat more than once topped three dollars a buhels and bread was too dear for the poor. In 1917 again, U-boat sinkings were so heavy that Britain's wheat reserves fell to as low as ten days' supply.

To guard against the risk of starvation as far as possible, and also to set free the greatest possible amount of shipping for munitions of war, two things are necessary. The one is to cut down food consumption to the

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lowest level that will keep the British people fighting fit, at the same time taking strict measures to prevent waste. The other is to boost production to the highest possible level.

In fact it was seen in 1939 that production of some foods must be reduced to make way for others. For instance less lamb, and not more, is being produced in Britain today, because the sheep pastures have been wanted to grow grain and potatoes. There is also a much reduced output of bacon and eggs, because it would be poor business, from the standpoint of wartime shipping, to import the feeds on which our pig herds and poultry flocks so largely depended in time of peace. Farmers have been hurt by these changes, especially the many small men who depended on pigs and poultry for their livelihood. Some of these have been put out of business. But such hardships are inevitable in war.

Apart from the conversion of pasture to grain, potatoes, sugar beet, vegetables and other necessary crops, quite a large amount of land which had been lost to farming has been reclaimed. Wet fields have been drained anew, large areas of scrub and fern-covered country have been cleared, and much sour and phosphate-deficient land, that was producing almost nothing, has been limed, fertilized and broken for cropping. There is of course another side to the picture; considerable sections of farm land have been taken for aerodromes, army training grounds and other war purposes. Around the south and east coasts the construction of defense works has made many difficulties for farmers.

This is the third year of Britain's food production effort, and a few figures may serve to show what has been achieved. The total area of crops has increased from about 12 million acres to around 18 million. This year the potato crop covers 70% more land than in 1939. Oats are up from 2½ to over 4 million acres. Vegetable production has grown from 3 million to 4½ million tons. The dairy herd has been somewhat increased. All this has been done without any addition to the industry's man power. Indeed many thousands of men have left the land for the forces, and their places have been filled by Land-Army girls, students, school children, and prisoners of war.

Another big drive has been made to cut out waste of every kind. In most towns there is a well organized system for collecting kitchen waste, which is sterilized, concentrated, and delivered to farms once or twice a week for pig and poultry feed. Pasturage that would formerly have been

allowed to waste is now made into grass silage. Next winter many thousands of farms will be equipped for converting wheat straw into a useful feed for cattle by soaking the cut material in caustic soda.

The increased crop production has been made possible mainly by a steep rise in the numbers of tractors and tractor implements. Britain had 54,000 tractors before the war and now has 110,000. These, of course, all burn kerosene, in order to save gasoline for other purposes. Many of these tractors, and much other equipment, have had to be imported, since many British farm-machinery plants were turned over to munitions in the first month of war. British farmers appreciate the very generous help that they have had from the United States, Canada and Australia in this vital matter. Without this help they could not have accomplished nearly so much. Meantime the village craftsmen of England have patched together and kept going a great deal of other equipment that was about ready for the junk heap.

British farmers today work under a strict system of control, and are subject to severe measures when these are necessary. Inefficient farmers who cannot improve their methods just have to quit farming. It is an offence to leave corn stacks without thatch, to feed wheat to livestock, and of course to neglect to carry out the cropping program that has been ordered. There have been heavy fines and even imprisonment in a few flagrant cases. In the main, however, farmers have seen that severe restrictions on their liberty were necessary, and both they and their hired men have shown a splendid spirit of cooperation with the government.

The chief reason for this excellent spirit is that the government's program is administered mainly by well chosen practical farmers. Necessarily the County War Executive Committee, who work for the Minister of Agriculture, have large office staffs. Every month, for instance, each dairy farmer has to get ration cards to enable him to buy oil-cakes and other dairy feeds, the amount being calculated on his milk sales for the previous month. In the office is a file for every farm, with particulars of its land and livestock, its cropping schedule for the year, and an appraisement of the efficiency of management in the previous season. There is a labor bureau to provide the farmer with hired or voluntary help, and to organize gangs of prisoners, soldiers or school children. There is a machinery section, which has its own tractors, ploughs, drills and binders and which can help the

farmer if he gets in arrears with plowing, seeding or harvesting.

But the actual contact with the farmer is through a district committee, composed of local men of high standing in the community. In the end, of course, the farmer gets written instructions from the County Office on his cropping, but only after he has had an opportunity of fully discussing his program with the farmer representatives of his district committee. These hear the farmers' own plans, and, if these plans seem reasonable, they go. Often there is discussion and persuasion, and only if these means fail does the farmer get orders. Six thousand of Britain's best farmers are spending long days, often two or three a week, on this Committee work, and all without pay or reward.

Behind the practical men is a group of technical and scientific men who are called in if special problems arise. If a farmer plans to plough up a pasture and fears that wireworms may destroy his crop, an entomologist can come along and estimate the wireworm population in the soil. If there are half a million per acre it will be risky to seed fall wheat, but reasonably safe to seed spring grain. If there are one million wireworms spring grain will be likely to fail, but beans or flax will still succeed. If the field seems short on lime or phosphate, the chemist can be called in to analyze. If the trouble is wet spots the drainage officer will help to recondition the drains, supplying labor and machinery if necessary. If the cows are low on yield the dairy husbandry fieldman will come along and advise.

As might have been expected, a few farmers have been inclined to rebel against all this interference with their business, but the very great majority readily accepted strict control as a necessary evil in time of war. They have filled up their forms and filed their applications with as good a grace as could have been expected. Now, in fact, a good many do not want to go back to the old free-and-easy ways of peace. They appreciate the opportunity of discussion with the most skilful of their neighbors, and they realize, many of them for the first time, how much value they can get from technical and scientific officers. Nearly all are coming to admit that, if the country is in fact willing to give the farmer security and reasonable prices, then the country has the right to demand efficient farm management. The old attitude—that every farmer should be allowed to do as he likes with his own land—is dying fast.

I am asked what will be Britain's farm policy when the world is again at peace. Will she take the line that maximum produc-

tion must be maintained, regardless of cost, in order to ensure her food supply in the event of still another war? Will she want to settle more people on the land, in order to restore the balance between agriculture and industry? Will she shut out cheap food in order to keep her worst farmers in business and her poorest land in production? I do not think so. It is true that Britain neglected her agriculture before this last war, and allowed some land to go to waste that was worth preservation. But she must beware of the opposite extreme—of paying dearly in terms of a lowered standard of living for the idea of self sufficiency. Fundamentally the British believe that the exchange of goods between nation and nation can be of great benefit to all. What Britain will try to do, I believe, is just to keep in production all of her land that is really worth farming, to make it produce what it can produce best, and to ensure a reasonable standard of living to the efficient farmer and to the competent and industrious hired man.

Farmers' Ambassador to U. S. A.

FOR the first time in the history of the British Empire, Britain now has an agricultural attache in the United States. The British government has designated Prof. J. A. Scott Watson, Professor of Rural Economics, Oxford University, to be the farmers' ambassador and the appointment meets with approval on both sides of the water.

Prof. Watson has had an interesting and brilliant career. Your editor has known him since college days at Iowa State, but let the British-American Agricultural News Service of London tell you something of the attache. Commenting on the appointment they say—

"We are happy that he (Scott Watson) is going to Washington, D. C., not only because he is one of our most practical and knowledgeable agriculturists, but because he is a frank and simple and very human person himself. He comes from the soil, for he was the third of eight children of a tenant farmer in the Scottish county of Angus. He began at the village school and hoped to become a farmer himself, but by the time it was his turn, there was not enough money left to set him up on a farm. So he scrambled through the university entrance examination and at the age of fifteen went to Edinburgh to study agriculture under Prof. Robert Wallace, a relative and close friend of "Old Uncle Hen-

ry," grandfather of the Vice-President of the United States.

He won a scholarship of $500 a year and with these slender resources managed to spend a year in Berlin and a second year in Iowa State College, that already had an international reputation. Here he came under the influence of Curtis and Kildee. He received his Master's Degree the same year that Vice-President Henry Wallace graduated at Iowa State. He meant to stay in the States and was on the point of accepting a post at the Montana Experiment Station. Then Prof. Wallace asked him to come back and accept a post at Edinburgh. After hesitation and regrets, he booked a passage to Liverpool and arrived home with $1.50. Now, after 32 years, he is re-crossing the Atlantic.

But time has not stood still for him in that period. He fought and was wounded in the last war. He succeeded Wallace as professor at Edinburgh. He has won medals and honors and has written many books, as well as taking over the management of a 500-acre farm that he changed from a liability to an asset, partly by introducing tractors, combine harvesters and other American farm machinery. It is he, also, who, as a great admirer of the 4-H Clubs, has worked hard to introduce a similar system in England.

But most of all he is known in Britain for his far-reaching and practical knowledge of his subject. There is no other man in Britain who has quite his gift of being able to explain difficult things so simply that the most expert farmer respects him and the most ignorant understands what he is talking about.

Prevents Milk Fever

During the last few months of a cow's gestation period, Albon Sordahl, Vernon County, Wisconsin, feeds 2 tablespoons of limestone flour a day. He has a herd that goes above 500 pounds of fat a year, and has not had a case of milk fever since he began feeding the pulverized stone. Tests have shown that milk fever is caused by calcium deficiency, and one of the treatments for its relief is an injection of calcium into the blood stream. That is not likely to be needed if the calcium intake is high at the time large quantities are needed to form bones of the unborn calf.

—*Capper's Farmer*

What You Can Do with Old Iron

Condensed from Farm Journal

SCRAP experts say the average farm has 500 pounds of scrap iron. To gather old iron (and other scrap badly needed in our war effort), a national scrap harvest is under way all over the country. State and local salvage committees have been named or soon will be. Almost everybody who knows what scrap looks like is helping in the harvest.

Sample of a good harvest is the one around Denison, Iowa. Farmers there were so busy that the merchants and professional men pitched in and made a survey to locate and tabulate junk on farms roundabout. Then they got nine trucks with volunteer crews to pick up the junk. Eight dollars a ton spot cash was paid for old iron. In six days, 150 tons were harvested.

The plan was so successful that neighboring towns took it up and began competing with each other. Atlantic and Red Oak, Iowa, got into a contest—the losers to clean the streets of the winning town. Then Harlan, Iowa, stepped in and said they could beat all the others, or would carry water.

Instead of crops, Wisconsin farmers will bring junk to their community fall festivals. Festival plans call for street dances, band concerts, etc. Farmers displaying receipts for old metal, rubber and other scrap will be given reduced prices in trading at the stores.

The big idea is to get farm scrap started to the steel mills before winter sets in. Scrap is hard to locate under a blanket of snow. Hauling is more difficult in winter. Local salvage depots have been established where farmers can have scrap weighed and get weight slips.

However, patriotism rather than profit should be the chief motive in collecting scrap. The government has established ceiling prices, but has not set prices which junk dealers must pay. While it's good business to get all you can for junk, haggling over price should not let any scrap stay on the farm. Ceiling prices limit the amount a junk dealer can afford to pay.

Besides old iron, other items of scrap needed in the war effort are other metals, particularly aluminum, copper and lead, rubber, collapsible tin tubes (tooth paste, shaving cream, etc.), waste cooking fats, old Manila rope, burlap. Here and there a local salvage committee wants rags, tin cans, waste paper and glass

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bottles. Better see if these are wanted locally before taking them to the salvage depot or junk dealer.

Don't wait for the local scrap committee or the junk dealer to come to the farm and ask for scrap. Search the place yourself. Take Junior along; his eyes are sharp. If you don't have time (or tires) to haul it, ask the oil man or the coal man if he can take some of the scrap back to town with him. Or, call the local salvage committee.

If you want to donate scrap, give it to a church or school; or to the Future Farmers, 4-H'ers or Boy Scouts; or to the Salvation Army or a local charity. This way it will serve more than one good purpose.

Each item at the left below provides the amount of scrap normally required for the military item at the right:

One disc harrow = 10 anti-aircraft directors or 210 semi-automatic light carbines

One hand cornsheller = 3 6-inch shells

Sixty tooth-paste tubes = Solder for electrical connections, 1 Flying Fortress

One wash pail = 3 bayonets

One sulky plow = 100 armor piercing projectiles (75 mm.)

One flatiron = 2 steel helmets or 30 hand grenades

One old tractor = 580 machine guns (.30 caliber)

Ten grain drills = 1 light tank

One 1-horse cultivator = 2 60-mm. mortars

Twelve mowers = 1 3-inch anti-aircraft gun

One 2-bottom tractor moldboard plow = 1 75-mm.-howitzer

One old tire = Rubber for 12 gas masks

One copper kettle = Copper for 84 rounds of ammunition for automatic rifle

One vacuum cleaner = Aluminum for seven .50 caliber machine guns

Drills Rye into Clover

Five advantages in drilling rye in sweet clover for grazing are noted by Russel Guscette: 1—earlier grazing in spring; 2—less bloat danger; 3—variety of feed; 4—greater palatability; 5—more uniform stand. He waits in fall until Barnes County, North Dakota, gets a rain that will bring the rye up promptly to a good stand. Then he cuts it in with a disk drill with little or no damage to the clover.

—*Capper's Farmer*

New Hog Cholera Vaccine Proves Effective

Condensed from The Western Farm Life

Dr. G. H. Glover

HOG cholera, known originally as swine fever, was first recognized in Ohio in 1883 and has spread by easy stages over most of the world. It is unique among epidemical diseases in that it affects only the hog species.

The ravages of swine fever and contagious pleuro-pneumonia in cattle constituted the real incentive for organizing a group in the United States Department of Agriculture known as the Bureau of Animal Industry. Four scientists of repute were assigned the task of investigating this malady of hogs with the view of determining effective means of control. These men were M. Dorset, H. T. Bolton, C. N. McBride and W. E. Niles. Dr. McBride is the only one now living.

Their work marked an epic in the science of immunology. Laboratories were established for this work in the vicinity of Ames, Iowa, which is located near the center of the Corn Belt, where hog cholera was most devastating. It was here, and under the auspices of these men, that the serum-virus system of protection for hog cholera was perfected. At first the lay public was suspicious of the claims that hogs could be rendered immune from the scourge of cholera. This fatalistic attitude was dispelled when several public demonstrations at stockyards proved conclusively that all vaccinated hogs remained healthy after exposure to the disease, and all unvaccinated hogs contracted the disease and died.

The simultaneous use of serum and virus has saved millions of hogs, but there have always been objectionable features that could never be eliminated. McBride, who shared the honors with the others in perfecting the one and only agency whereby hogs could be protected against cholera, and cured in the early stages of the disease, has been working at the Ames, Iowa, station for a long time on the project of a tissue vaccine. This will be equally effective in immunization with the objectionable features eliminated. Substantial progress has been made and his crystal-violet vaccine is very promising.

But this is not all the story in the realm of prophylaxis respecting hog cholera. William H.

Reprinted by permission from The Western Farm Life, Denver, Colo., Sept. 15, 1942

Boynton, of the University of California, has developed a tissue vaccine (BTV) which apparently is the last word in vaccination against hog cholera. The use of disease-producing cholera virus is eliminated, there are no systemic reactions from vaccination, there are no losses from vaccination, "necro" is not "fired-up" by vaccination, and there is no danger of spreading cholera in the community.

At the start of the tests with the new serum it was thought that two doses of the vaccine would be required to produce adequate immunity. The first 100,000 hogs immunized were each given two doses at intervals of several weeks. More recently, a large percentage of the pigs vaccinated in the Middle West have been given but a single injection, and immunity until marketing has resulted.

That the immunity following a single injection is of longer duration than had at first been supposed has been noted in several cases. In one instance in Illinois a group of 70-pound pigs were vaccinated in October with a single dose of the Boynton vaccine and the owner was advised to notify the veterinarian when the brood stock was to be picked out so they could be revaccinated. However, several sows were sold and not revaccinated. In June the young pigs born to these sows came down with cholera, while the sows which had been vaccinated 9 months previously with BTV were not affected.

In other cases, BTV vaccinated pigs were held long beyond the usual marketing time and infection with cholera deliberately attempted. In each such instance, non-immunized control pigs were also exposed. These came down with cholera, while the BTV-treated animals withstood this severe exposure to a marked extent.

The fact that the Journal of the American Veterinary Medical Association carries an advertisement of this vaccine seems to establish an endorsement of the highest tribunal in the profession of veterinary medical science.

Feeding Vitamin A to Dairy Cows to Increase Milk Production

Condensed from Certified Milk

Logan T. Wilson, Ph.D.

Walker Gordon Laboratory Company, Inc., Plainsboro, N. J.

THIS paper is for the most part a preliminary report on some results we have obtained with a commercial vitamin preparation which goes by the name of Synergol. This is presented with no thought of attempting to promote this product but simply as an account of our experience with it.

Synergol is manufactured by Dri-Food Products, Inc., 12 Franklin Street, Brooklyn, N. Y. It is essentially a combination of starches, vegetable oils and vitamins A and D from fish oils. These are combined by a process which yields a dry granular product from which the oil does not separate and it is claimed that the vitamin potency is retained quite well over considerable periods of time. It contains 250,000 U.S.P. units of vitamin A and 70,000 U.S.P. units of vitamin D per pound. It contains a minimum of 30 per cent fat and 57 per cent carbohydrate. The product was developed by D. Livingston of Dri-Food Products, Inc.

This product was first called to our attention in the fall of 1939. It was claimed that when fed to dairy cows at the rate of one-half pound per cow per day it had been found to increase milk production. A test of this material was then in progress at Mahopac Farms, Mahopac, N. Y., and the data presented from this trial indicated that an increase in production was being obtained. We were quite skeptical about the prospect of obtaining any increase from the product under our conditions as we had not found that vitamin D fed as irradiated yeast for producing vitamin D milk caused any improvement in production and our ration, which includes machine dried alfalfa, alfalfa silage, and corn silage furnishes a comparatively large amount of vitamin A as carotene. However, we started a group of four Holstein cows on one-half pound per day of the Synergol and compared their production with that of a control group. There was a gradually increasing difference in

Reprinted by permission from Certified Milk, New York City, Sept., 1942

production in favor of the Synergol fed cows which reached its maximum after seven weeks of feeding. A differential of 3 to 4 quarts per cow per day was maintained for a period of 14 weeks—that is till the end of the test.

This was followed by a number of tests on other small groups of both Holstein and Guernsey cows. The Holstein groups as a rule showed a response in milk production similar to, but somewhat smaller than, the first test group. The Guernsey groups did not show as large an increase in milk production, but with cows of this breed we obtained some increase in the butterfat test. As a result approximately the same increase in butterfat production was obtained for cows of both breeds. This amounted to about 0.18 pound of butterfat or the equivalent of 2 quarts of 4 per cent milk per cow per day. We did fail to get any increase with two groups which were started on test in the summer of 1940. We anticipated some difficulty in carrying on a test in the summer, as periods of hot weather cause considerable disturbance in the production records of our herd. However, we wished to know what would happen during this period. So far we do not have enough data to indicate whether or not feeding Synergol will increase milk production in the summer time under our conditions. It might be added that our cows are kept in barns throughout the year and are affected more by summer heat than cows out in open shade would be.

Before touching on other phases of this work I am going to present the results of some larger scale feeding tests with Synergol. In February, 1941, we put one barn of 50 cows (Barn No. 1) on Synergol and compared the production of this barn with that of another barn of 50 cows (Barn No. 2), both barns being fed and looked after by the same man. After an 8 week period the feeding of the Synergol was reversed. It was discontinued in Barn No. 1 and fed to Barn No. 2 for a ten week period. Figure No. 1 shows what happened to milk production. Figure No. 2 represents milk production in terms of quarts of 4 per cent milk per cow per day. The 4 per cent milk is calculated from the actual milk produced and the butterfat test on a straight arithmetic conversion. Thus, 4 per cent milk actually presents the amount of butterfat produced. It can be seen that Barn No. 1 increased in milk and butterfat production during the Synergol feeding period, while Barn No. 2 came up to the level for this barn at the beginning of the experiment. The difference in favor of Synergol feeding was calculated

by taking the average production of each barn for the two weeks before the test started as a base and finding the gain or loss each barn makes over this base. Subtracting the gain or loss of the control group from that of the Synergol fed group gives the difference in favor of those fed Synergol. For the second four week period (Barn No. 1 on Synergol) this averaged 1.40 quarts of 4 per cent milk or 0.121 pound of fat per cow per day. For the third four week period (Barn No. 2 on Synergol) this difference was 1.46 quarts of 4 per cent milk or 0.126 pound of fat per cow per day. It might be pointed out that the normal handling of the cows in these barns was not changed except for the Synergol feeding. There were a number of cows being replaced in these barns as the experiment progressed. In fact, there was also some changing of cows from one barn to the other. These changes would tend to reduce the difference due to Synergol feeding from what would otherwise occur as it appears to take 4 to 6 weeks before this feeding shows its full influence.

The next large feeding test started in January of this year. We began feeding all of the Holstein cows and 40 per cent of the Brown Swiss cows in the herd. This covered very close to 40 per cent of the herd. The Holstein cows were fed because the butterfat test for the herd was running over 4 per cent and an increase in volume of milk would be of more economic value, than an increase in butterfat content. Our herd is divided into 11 different cow units, each owned and operated by a different individual. Since their interests were involved in any commercial application of this type of feeding we wanted them all to have some experience with it.

The same system of feeding was used as previously. The Synergol was fed individually to each cow selected, at the rate of one-half pound per cow per day. For an over all comparison we used production records this year (1942) vs. production records for a corresponding period last year (1941). The records studied are those for the whole herd, approximately 1,500 cows, although only 40 per cent, approximately 600 cows were fed. The results are shown in Figure No. 3. This shows the amount of milk actually produced, as well as the 4 per cent milk calculated as explained before. For the first 8 weeks there was no apparent response to the Synergol feeding. However, from then on there was a marked response and the highest average production in the history of the herd was obtained. For the 10 weeks after the first

eight weeks feeding the calculated difference over 1941 production averaged .842 quart of 4 per cent milk or .0724 pound of butterfat per cow per day. If we give the Synergol fed cows credit for all of this difference it would represent 2.105 quarts of 4 per cent milk, or .1810 pound of butterfat per cow per day. Just why there was no apparent increase till after the 8th week of feeding whereas previous tests gave a maximum response in 4 to 6 weeks, is difficult to say. One reason may be that the number of fresh cows in the herd during the first three weeks of the test and for the four preceding weeks was lower in 1942 than during the corresponding period in 1941. By fresh cows is meant cows in their first to sixth week of production.

Let us briefly consider the economic aspects of Synergol feeding. The present cost is 22c per pound F.O.B., New York. Freight to Plainsboro adds about 0.3c per pound. At the rate of one-half pound per cow per day this amounts to slightly over 11c per cow. Assuming that the increased milk production is 2 quarts of 4 per cent milk the net cost of this extra milk is slightly over 5½c per quart or $2.44 per 100 pounds.

In this discussion of Synergol feeding the vitamin A potency of the product has been emphasized. This is in line with the results of Archibald and Parsons (1939) who report a favorable effect on milk production from the feeding of a vitamin A supplement at the rate of 28,000 to 34,000 U.S.P. units per cow per day. Deuel and Nuttall (1941) also report an increase in milk production resulting from the feeding of 700,000 International Units of vitamin A per cow per day. However, Rupel et al(1941) report that they failed to obtain any increase in milk production when feeding 1,300,000 units of vitamin A per day as shark liver oil, although the feeding did increase vitamin A and C in the blood, and produced some increase in vitamin A content of the milk.

One might consider the possible influence of the fat in the Synergol in view of the fact that Maynard and associates (1941) obtained some increases in production by feeding a high fat grain mixture as compared to low fat mixtures. The grain mixture we have been using contains about 3.9 per cent fat. The addition of one-half pound of Synergol to the feed of the cow brings the fat percentage of the concentrates up to 4.8 per cent. It is very improbable that this increase in fat intake would produce any significant increase in milk production.

Another consideration is the

digestible nutrients furnished by the starches and fat in the Synergol. One-half of a pound of Synergol, the amount fed per day, furnishes about 0.6 pounds of total digestible nutrients which, according to the Morrison feeding standard, is sufficient for almost 2 pounds or a little less than one quart of 4 per cent milk. The Synergol has been fed in addition to the feed the cows usually received so that the energy value furnished by the Synergol might account for part of the increase in production. However, most of our feeders aim to feed their cows up to the practical limit of their capacity to produce and I am sure that we could not satisfactorily increase production simply by feeding more feed. The calculated total digestible nutrients furnished by our average ration is a little in excess of the amount recommended in the Morrison standard. Also, we fed one small group of cows on what we might call Synergol with the vitamins left out, and we failed to show any increase in production over a similar control group.

Summary

The feeding of a commercial vitamin preparation in amounts furnishing 125,000 U.S.P. units of vitamin A and 35,000 U.S.P. units of vitamin D per cow per day has resulted in increases in milk production equivalent to approximately 2 quarts of 4 per cent milk per cow per day. Such results have been obtained in a number of tests with small groups of cows, and in two large scale trials involving 50 and 600 cows, respectively. However, a test with two small groups in the summer time failed to show any increase.

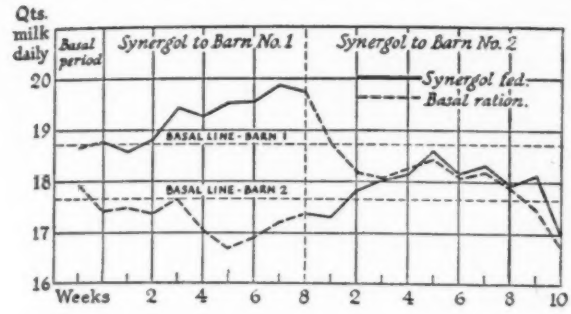

FIGURE 1

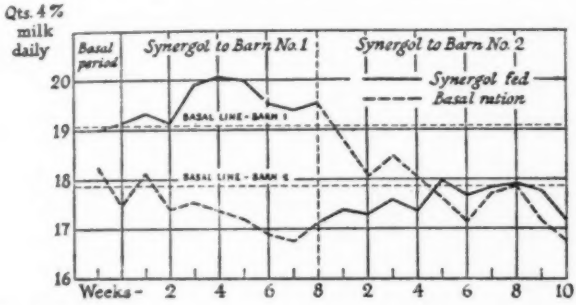

FIGURE 2

Change in production:

Barn 1 - Qts.	+0.05	+1.00	+0.44	+0.57	-1.01	-1.02	-1.93	-1.21	-2.32
Barn 2 - Qts.	-0.49	-0.52	-1.01	-0.75	-0.59	-0.52	-.20	+.03	-.71

Difference:

Synergol vs. Controls	+0.54	+1.52	+1.45	+1.32	+0.42	+.50	+1.73	+1.24	+1.61

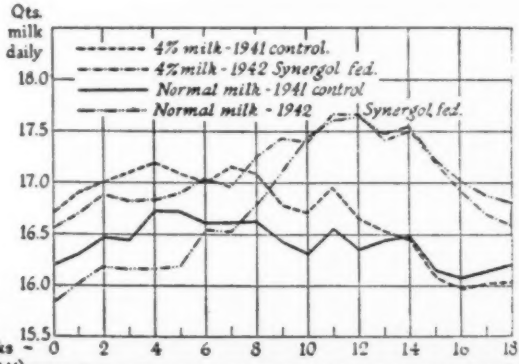

FIGURE 3

1942 vs. 1941 4% milk	-.14	-.12	-.36	+.03	+.17	+.69	+1.02	+1.06	+.94	+.55

Hogs on Concrete

Condensed from Kentucky Farmers Home Journal

THE confinement system of producing low cost pork is receiving increasing recognition as one of the most important advances in hog raising in many years, in the opinion of leading farmers in the Middle West. This is particularly fortunate in view of the nationwide effort to produce more food to assist in winning the war.

In this system, pigs are farrowed in a central house, or in individual houses placed alongside the concrete feeding floor, and confined on concrete the entire time from farrowing until ready for market. However, some farmers prefer a slight departure from this method, keeping their pigs on concrete until after they are weaned, then turning them out to pasture. Later, they are returned to the paved feeding floor for fattening until marketing time.

The central farrowing house or row of individual houses and the adjoining paved feeding floor make up the simple but important equipment in the confinement system. The experience of farmers in the corn belt who use this plan demonstrates that any feeder willing to develop a feeding ration including all food elements and pay close attention to sanitation can use the system successfully and profitably.

Experience also proves that with good management the confinement method produces pork at a comparatively low cost. Expensive equipment, such as fences, for example, is eliminated and feed and labor costs are low, feeders say.

A study of Illinois hog farmers showed that, on the average, 485 pounds of feed in addition to pasture was required for each 100 pounds of gain for hogs up to an average of about 250 pounds.

On the other hand, good managers using the confinement system report an average requirement of 300 to 350 pounds of feed per 100 pounds of gain and no pasture is needed. Thus, a saving of about 135 to 185 pounds of feed per 100 pounds of gain is possible with this system. In other words, those using the confinement plan produce 100 pounds of gain with approximately 325 pounds of feed, whereas about 50 per cent more feed is required, in addition to pasture, with usual methods of hog raising.

Building a sanitary concrete feeding floor is a simple job that may be readily undertaken by the hog feeder himself, by regu-

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lar farm labor or by a concrete contractor.

There are no wartime restrictions on this type of project, for the War Production Board permits farmers to spend up to $1000 during the year in constructing productively useful farm improvements. Paved feeding floors may be put in as part of any farmer's improvement program. Sand, gravel and cement for making concrete are plentiful and can be secured easily, since they are not on the WPB's critical materials list.

Salt in Livestock Nutrition

Condensed from The Shorthorn World

Professor G. Bohstedt

University of Wisconsin

SHOULD salt be fed in rations of farm animals? To such a question the almost universal answer of stockmen would be: Why, of course!

But if the questioning should go further and should include such points as the requirements for salt of the different classes of farm animals and of individual animals, or how different rations might affect the salt requirement of animals, there would in most cases be no very definite reply. It will be realized that in most cases salt has been fed very haphazardly, and not at all closely in keeping with the demands and requirements of most farm animals.

When we consider the composition of the animal body in reference to salt, we are struck by the fact that the vital fluids of the body, the blood, digestive juices, and other fluids, are very rich in salt, far richer than other parts of the body. Incidentally the term "salt" in this discussion covers both ordinary salt as we know it, or the two elements, sodium and chlorine, that together make up salt. But the fact that the essential fluids are very rich in salt is highly significant, for the composition of these fluids determines their function and service to the body.

Where the body as a whole has 0.27 per cent salt, the blood has 0.58 per cent salt. It can readily be demonstrated that heart action in an animal depends on the presence of this mineral. A so-called physiological salt solution may be made to serve as the circulating fluid through the heart of a recently killed cold blooded

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animal like a frog or a turtle, which heart by this means can be kept beating for some hours after other life functions have ceased. Without salt this phenomenon would not take place.

Thus by virtue of salt in the blood, circulation keeps going, there being apparently a stimulating effect of salt and other minerals on the nervous system of this vital organ. The elements of salt likewise permit respiration, for the carbon dioxide carrying capacity of the blood is due in large part to the presence of a sodium compound. After the blood through the capillary blood vessels reaches the myriads of microscopic cells of the body, these cells have their water content regulated, and are nourished, also have their waste products removed, because salt either as such or by virtue of its two elements in various combinations, controls the process called osmosis. Nerves and muscles need to respond to stimuli, and their quick responses are conditioned by salt.

This mineral is present in the blood in larger amounts than all of the other mineral elements put together. Blood is very stable in respect to its salt or other mineral content, and does not tolerate a great fluctuation in amount. If necessary, the blood will withdraw from other parts of the body so that the life processes of circulation and respiration may continue unimpaired.

As an example of the relatively high stability of blood with respect to its salt content, it has been demonstrated that when large amounts of potash are fed to an animal, there is a correspondingly large excretion of sodium in the urine along with the potassium. This explains the heavy salt consumption of cattle that are on lush spring pasture which is rich in potassium. But the feed does not always need to be early spring pasture to prompt heavy salt consumption, for almost all roughages are relatively rich in potassium, and animals subsisting on roughage rations normally eat more salt than if they are fed large amounts of grain, as are steers that are on fattening rations. Blood, the circulating tissue, aims to protect itself at all cost and keep up its normal salt content.

Another essential life process is digestion, and here we are faced with a striking situation, namely the unusual acid content of the gastric digestive juice. Depending upon the kind of animal, this juice has from 0.3 to 0.5 per cent hydrochloric acid, the chlorine of this acid having been derived from salt.

Fairly rapid digestion of protein is desirable, for then there is less opportunity for intestinal putrefaction and the absorption

by the body of the toxic products.

In the small intestine the alkaline partner of chlorine, the sodium, is called into action, for sodium makes up a large part of the bile. There is good reason for the presence of the alkaline bile in the small intestine, for the various digestive enzymes present here do not work efficiently in an acid medium. Some of these enzymes come from the pancreas, or sweet bread, and function in the breakdown or digestion of protein, carbohydrates, and fats. Incidentally the pancreatic secretion is rich in salt. Again and again we are struck by the large amounts and obviously great importance of sodium and chlorine either working together as salt or working separately in other combinations within the body system. Salt in the first place makes possible the secretion of the various digestive juices and, after digestion and assimilation, makes possible the growth and development of various tissues, muscle, nerve, bone, fatty tissue, also hair, wool, feathers, hoof, hide, and horn.

Sodium, chlorine, or salt plays an all-important part in the intricate life processes. Obviously salt is indispensable. In view of the rather highly specific nature of salt in the anatomy and physiology of this animal, one wonders by this time whether a more or less haphazard way of feeding salt might do justice to an animal.

One may further wonder about this when contemplating the salt content of various animal products in contrast to feeds. Most animal products are considerably richer in salt than are commonly used feeds. The question then is, may feeds making up an ordinary ration be depended upon to supply this important mineral for optimum health and well being of the animal?

Beef cattle and sheep differ from dairy cattle in that they are not fed grain mixtures as consistently as are dairy cows that are given grain in keeping with their milk production, or dairy calves that are weaned from their dams a few days after birth and therefore along with limited amounts of milk need to be fed grains and concentrates far more consistently than beef calves that nurse their dams for 7 or 8 months. As a general rule, salt is not mixed with the grain of beef cattle and sheep as is the case with dairy cattle, and growers of beef cattle and sheep are therefore far more likely to self-feed salt both on pasture, including the open range, as well as around the barns or feed lots.

The part that roughage rations play in reference to salt consumption was mentioned in this article, but this roughage factor is

further emphasized by referring to the salt consumption of pregnant beef cows at the Illinois Experiment Station. Their entire ration consisted of roughage, clover hay and oat straw, with either corn silage, shock corn, or corn stover. These cows when they could help themselves to loose salt in salt boxes, consumed 1.60 ounce of salt for approximately 1000 pounds live weight, and therefore nearly 4 times as much as did fattening steers on their heavy grain rations.

Reference has been made to increased salt consumption of cattle on early lush spring pasture, and how the large amount of potassium in such succulent roughage causes a greater salt hunger on the part of the cattle. Such observations by European investigators were verified by a test at the Kansas Experiment Station where steers on early season pasture consumed more salt than later on.

The various trials referred to at Kansas, Iowa, Illinois, Wisconsin, Michigan and the Borden exhibit at the World's Fair, would suggest that farm animals, and especially ruminants or herbivorous farm animals, be allowed free access to salt in a suitable form and in suitable containers.

To be sure, salt has an appetizing value when mixed with ground grain as for dairy cattle. But the proof is overwhelming that merely mixing customary amounts of salt with grain does not satisfy the salt requirement of vast portions of our livestock population.

Salt on the average makes up less than 1 per cent by weight or cost of the entire ration, but this "less than 1 per cent" has a protective effect and health benefit out of all proportion to its own modest proportion or cost in the ration. Salt, while used in small amounts, has to do with the one largest single item of cost in livestock production, which is feed. Feed makes up 50 per cent of the cost of producing milk and over 80 per cent of the cost of producing meat. It seems obvious that we can bring about very great improvement, or, conversely, very great loss in accordance with the way we manage this largest single item of cost of livestock production.

There is more that a farmer can do for himself than can be done for him by any public agency. Naturally a great many factors enter the cost of production, but in so far as meat, milk, eggs, wool, and other animal products are concerned, feed is more important than any other single item of cost. And salt has a profound effect on the efficiency with which animals utilize their feed.

Salt in the ration and therefore

salt in the animal body makes for a satisfactory tone of the body, for glandular secretions, and for rapid growth and that deposition of fatty tissue among the lean that is prized so highly by the judges of carcasses, by butchers and consumers. Salt has a definite effect on market finish and on quality in meat.

And to feed salt is so easy, for there are so few rules to follow, the simplest rule being that whether ½ per cent or 1 per cent salt is fed in grain mixtures or not, salt should be accessible to animals so that they can help themselves to it as they feel like it. This practice is abundantly supported by experimental work, and for once at least the very human tendency of letting convenience be one's guide is a tendency which may safely be followed.

Drying of Milk Is Old Fashioned

Drying of milk is old fashioned, not new as many believe. Marco Polo, the medieval traveler, tells that the Mongols were drying milk back in the 13th century, and drying mare's milk in the sun. But it was not until World War I, with an accompanying shortage of shipping space, that powdered whole milk production became important. In 1899 production was about 1000 pounds—by 1919 more than 9 million pounds came out of driers. At present, production is six times greater than that.

The first shipment of powdered whole milk sent abroad in this war by the Agricultural Marketing Administration is helping to sustain allied soldiers fighting for freedom at Malta. Enough powdered whole milk was delivered in June to supply that garrison with more than 2¼ million quarts of milk—to "make" a quart of milk that tastes very much like pasteurized milk, add 4½ ounces of the powdered whole milk to a quart of water.

—*Certified Milk*

Ergot of Rye: New Source of Farm Income

Condensed from The Farmer

LIVESTOCK losses as a result of animals eating rye heavily infected with ergot has made ergot one of the most feared of all plant diseases. Now, however, there are farmers in some parts of the Northwest who will have a greater cash income from ergot than from the rye itself.

In the vicinity of Cooperstown, North Dakota, where the Cussons Seed House has recently installed a fanning mill for the purpose of fanning ergot out of rye, rye from some fields may run as high as 5% "ergoty" kernels. If it does the ergot in one bushel will be worth $1.12, plus paying the bill for the cleaning. That is figuring the roughly separated "ergoty" kernels at the prevailing price of 40 cents a pound uncleaned.

The war has been responsible for the great increase in the value of ergot. Formerly the supply came from the principal dark-bread-eating countries of Europe —Spain, Poland, Russia, Germany and others. Simultaneously with the supply being cut off, the need for ergot increased. Its importance as a blood clotting agent, and its other medicinal values, makes a generous supply of it necessary so long as the war continues.

Although rough separation of "ergoty" kernels from those that are healthy is possible with a good fanning mill, the separation necessary to make the product salable to drug concerns must be done by hand. On old country farms this hand separating was done by families in their homes during the winter months. It is done to a limited extent in this country, but the more common procedure is making a rough separation with a fanning mill, then selling that product to concerns dealing in ergot where the ergoty grain is run over an endless belt under a strong light, while girls pick out the big, dark purple ergot kernels.

It would appear that since ergot is so valuable now, artificial infection of rye fields might be found profitable. This has been tried, but without success. Weather conditions, stage of bloom, and other factors must be exactly right to make an infection spread. Some years ago the head of a Minnesota concern, which handles large quantities of ergot, rented a 40-acre field of rye, sprayed it with an ergot culture, and then when the crop matured it was found that the sprayed field had a lighter infection than an adjoining field where nature took its course.

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Short-fed Cattle Mean More Profit

Condensed from Iowa Farm Economist

Rex Beresford

BUY the plainer grades of feeder cattle, feed them more roughage and protein supplement and less grain than usual and cut down the length of the feeding period—that's the guess as to the profitable thing for cattle feeders to do this year. Here are the reasons.

Medium and good grade cattle make the kind of beef needed for the armed forces and for the bulk of civilian trade. This means that effective demand for cattle has shifted from the choice and prime grades to the plainer kinds with the result that the price spread between the top and lower grades has narrowed a good deal. This spread has been further narrowed by the lid on wholesale beef prices. The ceiling prevents packers from bidding up for choice cattle. But they can pay relatively more than usual for the lower grades, because it is possible to "upgrade" beef somewhat in spite of the ceiling regulations.

These new price relationships among grades must figure in the plans of the cattle feeder who wants to "keep out of the red." However, ceilings do make it possible to plan with a little more certainty than usual. Any experienced cattle feeder given the kind, weight and grade of feeder cattle being considered, and the proposed feeding program can estimate the outcome pretty closely. With a little figuring he can tell about how long the cattle must be fed, the gain that can be expected and the amount and value of the feed that will be required. He needs an additional 15 to 17 percent above feed costs to cover labor, risk, interest and other expenses. Under the ceilings he knows more definitely than usual what his cattle should bring. On one side of the ledger he has first costs of the cattle plus feed costs and incidentals—on the other, the final value of the steer. If the books do not at least balance, the smart feeder will wait until he can fill his lots with something that will pay out.

The old rule of letting the type and amount of feed the feeder wishes to market through cattle determine the type of cattle bought is sounder than ever this year. The feeder who has corn silage or fodder, sorgo silage or large amounts of hay should think first of the plainer and

Reprinted from the Iowa Farm Economist, Ames, Iowa

cheaper cattle. Long yearlings or two year old steers usually make most efficient use of heavy roughage and light corn rations, but the plainer heifers and young cows or "heiferettes" deserve a place in a roughage feeding program. Also, we have more native cattle of all classes than at any time since 1934, and these should not be overlooked by feeders with plenty of roughage on hand.

Shorter feeding periods and less "finish" are in the picture for the better grades. Even in normal years it has taken a rising cattle market plus a raise in grade to make it pay to feed for long periods. We no longer have the wide "spread" or premiums for choice and prime cattle which are needed to offset the high cost of carrying cattle with considerable finish thirty to sixty days longer and into the season of heat and flies. Few feeders realize the cost of putting on these last few pounds of gain. Let's look at these costs.

At Iowa State College 80 yearlings averaged 658 pounds in weight were put on full feed on November 20 and carried 8 months. At the end of 7 months these cattle averaged 1095 pounds in weight, an average gain of about 62 pounds a month (see table). In the next 30 days about as much corn was consumed as in any previous month, but gains were only 21 pounds per head. The cost per pound of gain in this final month was more than three times the average for the entire period and four times that of the first six months. Clearly, long feeding periods mean not only less profit but also an inexcusable waste of feed needed for more efficient production.

In normal price periods these startling figures have less significance because feeders have a fair chance to operate on a rising cattle market. For instance, with present feed prices an advance of around 65 or 70 cents per hundredweight would be enough to meet the cost of carrying these cattle for the last 30 days.

Cattle feeders cannot afford to bid for choice or fancy feeders as they have in the past few years. Big premiums for these kinds of feeders are "out" under present conditions. At usual price spreads the plainer grades are much more likely to pay out. Of course, if the picture changes so that the price of common and medium replacement cattle works too close to that of the better grades of feeders, the higher quality stuff might become the better buy. They have the advantage of being a little better "doers," along with a chance at higher selling price. If good and choice yearlings can be bought at not too great a premium, they may be handled just like the lower grades

for the first 120 to 150 days. Then give them an extra 30 to 60 days full feeding to raise their grade if the outlook is for a premium high enough to pay for the longer feeding period. But under present price and cost conditions there will be no profit in carrying such cattle beyond the good or low choice grade.

Feeding Period (days)	0-180	180-210	210-230
Average weight at end of period	1,033	1,095	1,116
Average daily gain (lbs.)	2.1	2.0	0.7
Average daily linseed meal (lbs.)	1.5	1.5	1.5
Average daily corn fed (lbs.)	10.8	13.6	13.5
Corn fed per 100 lbs. gain (lbs.)	515	689	1,953
Silage per 100 lbs. gain (lbs.)	733	...	...
Alfalfa per 100 lbs. gain (lbs.)	63	110	391
Linseed meal lbs. gain (lbs.)	77	84	218

Protects Fence Investment

To keep cattle from rubbing against his 47-inch woven-wire fence, Earl B. Newell, Carroll County, Indiana, strung an electrified wire inside at a height of 3 feet. This electric fence is supported by wooden brackets nailed to fence posts. Such a device is effective if the fence controller is switched on but a day now and then.

—*Capper's Farmer*

Cull Your Hens All the Time

Condensed from Eastern States Cooperator

John Vandervort

Poultry Extension Service, Pennsylvania State College

WHEN culling first became a common practice in the early twenties, it was considered a seasonal job. Most of the culls in a flock were removed during the months of July, August, and September. It is interesting to study culling records from Pennsylvania farm flocks over a period of 16 years. Forty-seven percent of the layers were culled from flocks during the laying year 1925-1926. About half were removed during July, August, and September. In 1940-1941, 42 percent were culled and only about one-third during the three summer months. In recent years there has been a noticeable trend toward consistent culling during each month of the year rather than a concentration of culling during the summer.

Frequent culling permits the flock owner to place on the market these questionable birds while they are in good flesh and are not in a heavy molt. Then, too, a larger percentage of fowl can be marketed during the months when the prices for this type of market poultry are best rather than to increase further the heavy supply during the summer months.

When the majority of pullets were hatched during the so-called normal spring season from March through June, the majority of these birds finished their laying year and went out of production during the summer following their maturity. They were then removed from their flock.

When poultrymen began to replace their laying flocks with summer, fall, and winter hatched chicks, culling procedure had to change. There was no need for heavy culling during the summer months as many of these flocks of out-of-season hatched pullets were giving a good account of themselves during the summer. In talking to several who have raised pullets out of season for many years, they state that no large number of pullets are out of production at one time. Culling is a gradual process over a period of several months. It goes without saying that pullets should be culled consistently during the growing season. Those that are physically unfit, undersized, and

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slow maturing should be disposed of.

There is no time when culling means so much as when pullets are mature and ready for the laying house. One should experience no difficulty in culling mature pullets. The desirable ones are most advanced in sexual and physical development. They are in good health and have developed normally. Disposing of pullets of questionable health will do much toward reducing mortality in the laying flock later on. Those with crow heads, sunken eyes, and pale legs, as well as the slow maturing ones, should be eliminated. The eye condition should be noted carefully. A pullet with a gray eye, showing an irregular pupil and an iris that tend to blend together, should not be kept. The mortality of pullets showing this condition is likely to be heavy during the first laying year.

The housing together of pullets of one age and state of maturity will reduce the percentage of culls. When the early maturing ones are housed, those slower can be left on range. These develop faster with fewer culls when the more agressive, better matured birds are segregated. Too often, pullets of all stages of development and of different ages are thrown together, resulting in a high percentage of culls appearing among the smaller, slower growing birds. Generally speaking, at least 10 percent of the pullets raised should be disposed of at housing time. Raising more than is needed is a sound practice.

With continual culling throughout the year, one needs to know whether a hen is or is not laying. Those out of condition and not laying show a pale shrunken condition of comb and wattles. These head parts are rough and may be covered with whitish scales. The healthy laying hen has a full red comb, and wattles, soft and warm to the touch. Signs of molt may be used as a guide to find those not laying. When a flock has laid sufficiently long to cause bleaching of the beak and legs of most of the birds, one should look with suspicion upon a hen showing considerable yellow pigment in those parts of the body. Extreme coarseness is an undesirable characteristic. A certain few in each flock become masculine and should be removed.

As a hen takes from 10 days to 2 weeks' vacation each time she goes broody, one should consider this factor in culling. The amount of broodiness will depend on the breed and strain. Many feel it desirable to dispose of every hen that goes broody; others permit one brood period before selling them. They should be banded in order to identify the ones that show this characteristic. They can then be sold at the end of the

laying year. One should be more lenient with pullets that start to lay in hot weather as there is a tendency for them to show more broodiness than the ones maturing in the fall.

Any hens kept over the second year as layers or breeders should be given a thorough inspection. Only those that show indications of having laid heavily should be kept. Futhermore, they should be in an excellent state of health.

Time and labor can be saved in culling by having an adequate supply of crates on hand. They are necessary for moving pullets from range and transferring hens from one pen to another. In selecting breeders and layers to keep over after the first laying year, one will want to catch and handle each bird. This being the case, a handy catching pen should be provided. This can be in the form of a hurdle, four feet high, with two panels hinged together. One of these can be six feet and the other four feet long. One end can be tied to the partition four feet from the front of the house. The four-foot panel is swung around to permit driving 50 to 75 hens in the pen at one time. The one who does the selection work stands inside, closing the pen, and hands the birds to a helper who places them in the adjoining pen or in crates.

An unused pen or a small building, such as a brooder house, provides a convenient place to hold the market birds until there is sufficient number to sell. From this pen one can catch individual birds for killing and avoid continual disturbance of the laying flock.

A catching hook should be kept in a convenient place in each house so that the flock owner can use it to catch the questionable ones as he goes about his daily task of caring for the layers. Some prefer to cull at night, using a flashlight while the birds are roosting. Less frightening of the birds results with this method.

Quick-Freezing

Not all strawberries and peaches are suitable for quick-freezing. In tests of 20 varieties of strawberries by the Experiment Station, New Brunswick, only 3 were rated as number 1. From among 25 kinds of peaches only 6 were found to be excellent.

—*N. J. Agriculture*

A Boom in Feathers

Condensed from Marketing Activities

H. L. Shrader
Extension Service

ONE of agriculture's small but vigorous offshoots—the feather industry—is looking around and liking what it sees. For one thing, the armed forces are showing an avid interest in every waterfowl feather in the country. But what really excites the feather merchants is the prospect of moving a large volume of lowly chicken feathers into consumption at fair prices. So the larger poultry killing plants are oiling up their feather machinery, and a few are even installing new equipment.

Operations will get under way in a few weeks when millions of chickens, in full plumage, will start moving by rail and truck to the great consuming markets. En route to their destination these Plymouth Rocks, Leghorns, Rhode Island Reds, and birds of other breeds will be taken to large commercial poultry establishments where they will be killed and plucked. Chief by-product of this operation will be feathers, about 13 million pounds of which will be saved for feathers as such.

These feathers, right after they are pulled from the chickens' backs, are an evil-looking mess—wet, dirty, and bloody. But the poultry plants, at least the large ones, are able to handle that situation. They dump the feathers into a special washing machine and turn on the current. The feathers come out with most of the dirt removed, and, after drying, they are stuffed in bags or bales and are ready to be sold to the feather processor.

In the hands of the processor, the feathers are given the works. They are washed with chemicals, steamed, and dried; they are disinfected; they are sorted; they are even "curled." When everything has been done that needs to be done, the feathers are ready to be stuffed into upholstery or bed pillows. And the way it looks now, chicken feathers are just about all that will be used in upholstery and pillows for civilians. Duck and goose feathers—what the trade calls waterfowl feathers — are "out" for the duration.

Prior to 1939, we imported

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about 3 million pounds of waterfowl feathers a year, mainly from Hungary, Poland, and China. But the war cut off the imported supply and we have had to get along with what we could produce here at home—about a million pounds or so. Now we are in the war ourselves and the armed forces need feathers badly—particularly soft waterfowl feathers. To make sure that this need will be met, the War Production Board, through Conservation Order M-102, has ruled that the manufacturer who uses soft waterfowl feathers must have a permit for furnishing the finished items to Government contractors.

One of the more important items is sleeping bags, which are designed for use by soldiers in Arctic climates. The bags are sewed in such a way as to make tufts or pockets, which are filled with down. Soldiers spread the sleeping bags on a tarpaulin or on the snow and climb into them "raw." Such is the insulating quality of the down that a soldier is perfectly comfortable even when the temperature drops as low as 40 degrees below zero. Yet the bag is light and is carried as part of the soldier's regular equipment.

The armed forces are also in the market for the coarser duck and goose feathers. These, because they are soft and have plenty of "spring," will be used in hospital pillows for wounded and sick soldiers. Chicken feathers won't do as well; they are basically flat and tend to lump up under the hard treatment they receive in a hospital.

This restriction of waterfowl feathers to certain uses of the armed forces leaves a wide gap to be filled by chicken feathers. Millions of pounds will be required for stuffing pillows—most of them for use in barracks or on board ship. And other millions of pounds will be needed by the upholstery trade.

Feather merchants aren't saying much about it, but they are hoping that the Army will be able to use feathers in its camouflage operations. As any hunter will testify, especially if he has been startled by the sudden flight of a covey of quail, feathers are one of Nature's best forms of camouflage. White feathers from chickens, if plastered thickly on netting, would make an almost perfect concealment for guns on a snow-covered terrain. And red feathers would make an empty field look like a red tile roof.

The price of feathers at the packing plant has been as low as a cent a pound—hardly enough to pay for the bother of handling them. But in recent months prices have been around five cents a pound. That is a different story and that is why the industry is gearing itself to

handle about 15 million pounds of chicken feathers this fall. Whether that volume is too much or not enough is a question the feather trade would like to have answered—and it is a question that is hard to answer.

One thing is sure: Even with demand what it is today, it doesn't appear economically wise to expand production too much. Any increase in demand that might come later could easily be met by utilizing the feathers produced in the smaller dressing plants. In Washington, D. C., for example, an estimated total of 3,600,000 chickens are consumed annually. The feathers from these birds total about 450,000 pounds—and are removed in about a dozen different establishments. If prices rose high enough in response to increased demand, however, salvage operations could be set up. The potential United States feather crop is enormous. With 800 million chickens grown on farms, and with the feathers from each chicken weighing about an eighth of a pound, production *could* total 100 million pounds.

Some members of the poultry industry argue that our present use of chicken feathers is wasteful. Only 15 percent of this year's production will be used as feathers; the rest will be hauled away as fertilizer. Of course, feathers make a fair fertilizer. They are largely protein, and protein breaks down into ammonia and other nitrogenous compounds that enrich the soil.

But it is still argued that feathers, being an animal fiber, could be put to some more useful purpose than fertilizer. It is a challenge to modern chemistry—and a challenge that has been accepted tentatively by scientists at the Western Regional Research Laboratory at Albany, Calif. Preliminary studies show that feathers can be dissolved and then brought back as a continuous fiber. They also may be turned into a waterproof glue.

At the Beltsville Research Center, at Beltsville, Md., the experimenters have attacked from a different direction. They have ground up the feathers in a macerating machine, the finished product being a soft fibrous material. These crushed feathers have unusually good insulating qualities, especially where weight is an important factor, and might be used as lining for overcoats or for quilted bedding.

Finishing Turkeys for Market

Condensed from Turkey World

G. P. Plaisance

AT this season of the year, everyone growing turkeys is making plans for fattening, or perhaps we should say finishing, his turkeys. Since the fattening or fleshing of turkeys has so much to do with their appearance, and likewise with their market price and grading, it is very important that all turkeys be finished properly before they are marketed.

Oftentimes, turkeys that are not finished properly are difficult to dress, and invariably when they are finished properly, they dress much easier and few pinfeathers are in evidence. A well finished turkey naturally has a good coverage of fat that is well distributed over the body, thus causing that turkey to roast better and look its very best when placed on the table, regardless of whether it is in the home, in the hotel, the restaurant, or the club.

It should be the aim of every turkey grower to *finish* his turkeys, regardless of whether the turkeys are to be marketed alive or dressed. Oftentimes, the buyers of live birds will stretch a point and give a little extra money for well finished turkeys. Any grower that has the reputation of always producing the best quality, always gets the attention of the buyer with the ultimate result that after those turkeys are dressed, the man that buys them can get more money for them, and consequently, he is willing to pass that extra money on to the grower.

There are many theories about turkey feeding and fattening. Of course, everyone thinks his method is the best. The turkey is a wise old bird, and if all necessary ingredients are provided, he can do a fine job of balancing his own feed all the way through the growing period. As the season advances, he will gradually eat less and less of the protein balancer part of his ration and more and more of the grain and other fattening ingredients. Some feel that no special fattening program is necessary and that the turkey will finish out satisfactorily without a special fattening diet near the end of the growing period. However, many turkey authorities are of the opinion that more rapid finish and better quality finish can be obtained with a special fattening diet.

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If turkeys are to have a special fattening ration, they usually are ready to start on it when they are about 22 weeks old, with the result that after four weeks of fattening, a large percentage of those turkeys can be sold at 26 weeks. This is true particularly when the turkeys have been full fed all during their growing period. If they have been full fed during the growing period, they have taken on a certain amount of fat, and consequently do not have to be on a finishing feed quite so long.

Usually turkeys that can be marketed around 26 weeks of age—6 months—are the most profitable. In some instances, it is necessary to carry them an extra week or two. Many factors are influential. For instance, if the weather is very warm, turkeys do not eat so much, and consequently do not gain so rapidly. For some reason, cool weather causes increased appetites and elimination of pinfeathers. It is a much more difficult job to fatten turkeys in late September or October than it is to fatten them for the Thanksgiving market; and it is much easier to have turkeys show a lot more finish when they are marketed at Christmas than at Thanksgiving.

As a rule, especially in large flocks, it is difficult to have all the turkeys ready for market at the same time. Perhaps 900 or 950 will be ready, and there will be 50 to 100 turkeys out of each 1,000 which, for some reason, do not carry the finish that will rate them as prime birds. It is always best to pick over your birds at market time and send only those that in your estimation would grade as prime, keeping that other 5 or 10 percent so that they can finish out properly. Those few birds with one or two extra weeks will improve rapidly. Usually those slow finishing birds are timid. They do not come up to the feed trough and eat as regularly as many of the birds. When they have an opportunity to shift for themselves in a small flock, after the big aggressive birds have been marketed, they will put on flesh rapidly and can be marketed one or two weeks later and grade as prime.

During September and October in many parts of the country, the days are very warm, and in many sections, warm nights are common. In weather like this, the birds do not have a good appetite—at least they do not eat nearly as much as they would eat if the weather were cool. There is a tendency for the birds to eat very little yellow corn in weather of this kind. As we all know, yellow corn, if supplemented properly with the right kind of protein ration, is one of the very best fattening feeds for turkeys.

But all will agree that the turkeys "back away" from corn when the weather is warm. With government wheat as plentiful and as cheap as it is this year, wheat can be used to make up part of the ration. But wheat will not produce quite the finish that can be produced with corn.

Many growers have found that turkeys may be induced to eat more corn in warm weather, if the corn is soaked or mixed with milk or a mixture of commercial condensed milk and water. In fact, soaking or mixing with milk will increase the palatability of any grain. Western growers are especially fond of soaking barley in milk. It is best to crack or crush grains to be fed in this manner.

When the weather is especially warm, good heavy whole oats is one of the grains most liked by turkeys and should be fed very liberally along with proper supplementation of protein products.

There is one disadvantage of feeding oats, wheat, and grains of this general class in that they are practically devoid of vitamin A. Of course, if the birds are on a good succulent green range of clover or alfalfa—in fact most any good succulent green grass—then this range can supply the vitamin A. But in dry weather in the absence of green food, when wheat, oats, kaffir corn, and barley, alone or in combination, are the principal grains, regardless of whether these grains are fed with home mixtures or commercial concentrate products, the lack of vitamin A can lead to, or tend to lead to sinusitis. Since yellow corn is so rich in vitamin A, it can supply that lacking vitamin which is so necessary. But, of course, if the weather is hot, even if the corn is in the trough, if it is not consumed by the birds, it will not alleviate the trouble.

A number of commercial firms make a special fattening ration for turkeys that does contain sufficient vitamin A. This feed usually is made in pellet form and because of the thorough blend and the fact that the feed is in pellet form (very palatable), it is possible to get a high percentage of yellow corn in that pellet with the result that the birds eat it regularly and in large quantities. Therefore, they make rapid gains even in warm weather, and the turkeys carry a good finish when they are dressed.

As stated above, in most climates it is much easier to fatten turkeys for the Thanksgiving market than it is for the earlier markets. During this season, turkeys usually will consume considerable corn because the weather is cool. As a rule, it is best to crack or crush the corn, even though the particles are large—

the turkeys eat it more readily. As a rule, turkeys should not be fed immature corn. If it is necessary to feed current year's corn, it should be well matured. Only a small amount of new corn should be used at first and the change made gradually. Old corn is much preferred.

Turkeys that are being fattened at Thanksgiving time can have a large percentage of their grain ration in the form of cracked yellow corn. Some oats can be fed, but as a rule, the Thanksgiving turkeys can receive approximately 65 to 70 percent of the grain in the form of yellow corn, and 30 to 35 percent in the form of whole oats. Whereas, for turkeys being fattened in late September and October, it is rare that one can get turkeys to eat more than 25 to 30 percent of their grain ration in the form of yellow corn. The balance of the grain ration can be oats, or oats and wheat. In sections where they are common, barley, grain sorghums, spelt, and emmer are very satisfactory.

Supplement Your Grains

It is not economical to attempt to fatten turkeys on grain alone. The grain always should be supplemented with growing mash or special fattening supplement.

During September and early October, perhaps 50 or 60 percent of the daily ration should be a palatable supplement, and the other 40 or 50 percent can be made up of grain, principally heavy oats, some wheat and a small amount of corn. As stated above, when other grains are common, they can be used in almost any combination.

For the Thanksgiving time a smaller percentage of supplement can be used and a larger percentage of grain can be consumed. The scientific reason for this is that the birds require more body heat when the weather is cool, and since carbohydrates—grain feeds—produce body heat and fat, they will be consumed to a great extent by the turkeys.

Fattening at Christmas Time

In most climates this is the easiest time of the year to fatten turkeys because of the cold weather. Plenty of yellow corn, along with a good protein supplement, will produce excellent results. This time of the year, the turkeys usually will eat corn very readily and corn can be used as the chief grain during that time.

In feeding turkeys, it is always best to keep feed before the birds in hoppers at all times. This is true especially during the fattening period. It gives the timid bird an opportunity to get food when the aggressive ones are away from the feeding troughs.

Conserve for Production

Condensed from Soil Conservation

R. H. Lush

Pasture Specialist, The National Fertilizer Association, Washington, D. C.

THE recent creation of the Foods Requirement Committee of the War Production Board places new emphasis on being in time with enough. Eight years' experience with soil conservation methods will enable cooperating farmers to produce more of essential food and feed crops with greater efficiency. But higher feed prices, transportation difficulties, and labor shortage form a particularly acute situation for the livestock farmer everywhere. Surplus wheat or corn, increased national supplies of soybean and other oil meals, and the usual supply of hay may not be available where needed because of freight congestion. Plans should be made to grow more feed where it is needed most—especially pasture, as it involves no cost in harvesting, processing, transportation, or storage.

Fertilizer tests on dairy pastures were conducted a few years ago in 15 Northeastern States. Superphosphate alone increased yields 34 percent; superphosphate and lime, 51 percent; superphosphate, potash, and lime 79 percent; and complete fertilizer and lime increased yields 138 percent. Nitrogen gave the added "kick" when large amounts of minerals were supplied. Milk yield per acre was doubled by the use of complete fertilizer. Results obtained in 103 tests in the same year showed an average of 1.7 extra pounds of protein from each pound of phosphoric acid used with potash and lime; and 3.1 extra pounds of protein from each pound of phosphoric acid used with nitrogen, potash, and lime. Crude protein was produced more efficiently from phosphorus used in complete fertilizer, and each pound of nitrogen applied was directly responsible for nearly 3 pounds of extra crude protein and about 10 pounds digestible nutrients in a very palatable form. Similar results have been obtained in the South and more humid parts of the West. A ton of average fertilizer will produce about 8,000 pounds of milk or 1,000 pounds of beef. With crude protein selling at over 5 cents per pound in

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its cheapest feed form, the fertilization of pastures and hay fields would seem to be the economical solution.

But while nitrogen is essential to most economical feed production, commercial nitrogen for agricultural use is limited until war needs are filled. Nitrogen should be grown and conserved as never before. Fortunately there are adequate supplies of 18- and 20-percent superphosphate, the recommended phosphate-potash, and some complete fertilizer grades for deficient soils, to grow increased acreages of adapted legumes where seed and labor may be wasted without fertilizer.

More legumes should be planted for grazing, ensiling, or turning under. More land should be made ready for alfalfa or clover. More cereals should be seeded for soil conservation and grazing; and still more clover and grass pastures should be started. A pound or two of Ladino clover seed ought to be added to every new seeding or pasture in the Northeast. Increased acreage of winter cover crops should be planted on all Southern farms; and adapted legume seed should be added everywhere if obtainable.

Best results usually are obtained from fertilizer applications at seeding time, or on the pastures in fall or early spring. But the war emergency calls for addition of the necessary plant-food on fields and pastures containing legumes as soon as possible. Legumes must be fed if they are to produce nitrogen to feed the soil, and in turn to feed the livestock. The 1940 census shows a National average of less than two acres of plowable pasture per animal unit. Pastures must be made productive for a longer time if livestock are to be better fed and more produce is to be obtained.

Several times as much nitrogen is lost through poor handling of manure as is purchased in fertilizer. An average ton of farm manure contains about 10 pounds of nitrogen, 5 pounds of phosphoric acid, and 10 pounds of potash. The amount produced annually per 1,000 pounds liveweight is about 15 tons by cows, 12 tons by horses, 10 tons by sheep or fattening cattle, 18 tons by hogs, and 4.2 tons by chickens. Sheep and chicken manure may be twice as high in nitrogen content as that from hogs or cattle. In the case of cattle and sheep, about one-half the nitrogen is in the urine. Probably one-half of the total nitrogen on the average farm is lost by leaching, use of insufficient bedding and through fermentation.

The use of superphosphate with fresh manure makes a more stable compound of the nitrogen, retards fermentation, and gives a

better-balanced plant-food for most soils. The addition of 50 pounds of superphosphate to a ton of average manure makes it the equivalent of 167 pounds of 6-9-6 fertilizer. The superphosphate can be added in the gutter, floor pens, dropping boards in poultry houses, or over the manure pile or spreader load. Because of the rapid loss of nitrogen in the form of ammonia, the sooner superphosphate is added, the more nitrogen is saved. Use 1 to 1½ pounds every day for each cow, steer, or horse; ⅛ pound daily for each hog or sheep; 1 pound for each 100 hens. When superphosphate is not used in the stable, 50 to 75 pounds should be spread on each load of manure.

For sanitary reasons manure must be kept away from the milking barn but must not be spread on fresh pasture. Land that is to be plowed immediately offers the most efficient use of manure. But where there are limited amounts, it is now best applied at half the usual rate in order to give more land some nitrogen. Fertilizer applications with the new crop can help make up the difference this season. Old sod that has no clover left can thus be manured, fertilized, and seeded to a suitable grazing crop and then top-dressed naturally by grazing animals. If no crop land is available, manure should go on pasture land after it has been grazed off.

In winter or bad weather, manure should be stored under cover after reinforcement. Dragging pastures to scatter manure should take place after grazing. The plantfood leached out will be absorbed and used by the grass. One of the chief advantages of rotational and supplementary grazing, aside from even milk flow, is the opportunity it gives for more uniform distribution and utilization of manure. This is especially true now, with labor and nitrogen shortages. Livestock should be on pasture or grazing crops rather than in the lane, dry lot, or around water holes where the manure may be lost. Some manure conservation has been practiced since farming began, but never has it been so important as now.

Something New in Pigs

Condensed from Successful Farming

J. C. Holbert

Iowa State College

ASK any farmer how long hybrid seed corn has been in use. He might say, "Quite awhile." Yet, on a commercial basis, it is not over 10 years old. An ideal created thru research has attained great practical value.

Taking the cue from producers of hybrid seed corn, research workers now are going full steam ahead on a program for producing a hybrid hog—not just any old kind of cross, but one which is founded on preliminary development of inbred lines. Don't say that livestock breeders have been asleep or a bit slow on the trigger. They have made remarkable progress in the past 100 years, but this cross-breeding business requires more time, more money, and far more effort than plant-breeding investigations. Hence we do have something of a time lag.

Thanks are due to establishment thru the Bankhead-Jones Act in 1935 of the Regional Swine Breeding Laboratory at Ames, Iowa. Working in co-operation with the state experiment stations, this breeding project covers the Cornbelt, where 70 percent of our country's hogs are grown. Under this plan each of the state experiment stations involved was assigned a certain phase of the project and put under the general direction of Dr. W. A. Craft.

As for breeds, Poland Chinas are being used at the Iowa, Minnesota, and Missouri experiment stations. The Nebraska and Oklahoma stations are working with Duroc Jerseys, and Indiana has Chester Whites and Duroc Jerseys. Inbred lines of Poland Chinas, Chester Whites, and Duroc Jerseys are being used at the Government station in Beltsville, Maryland.

Work is in progress with a crossed line of Landrace and Tamworth at a Minnesota substation, and at Iowa, in cooperation with the Pioneer Hybrid Seed Farm, performance studies are being made of a similar cross. The breeds at Iowa, Minnesota, Missouri, Oklahoma, and Nebraska were already established at those stations, and the Landrace was already established at Iowa and Beltsville. Hampshires were

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included at Illinois and Missouri to get an additional breed. Other breeds will be added as facilities permit.

Objectives are several-fold. One is to test a number of breeding systems or methods for improving swine; another seeks to improve such characteristics as production of sows, rate and economy of gains, and general vigor; and a third embraces the development of a better carcass and more successful methods of judging live hogs and carcasses, perhaps leading to a more desirable method to follow in buying hogs.

By studying pedigrees of established breeds to determine the percent of purity (by intensifying the blood of the breed thru purebreeding), we find that breeders of pure breeds have increased inbreeding approximately 0.5 percent per generation. It has been obvious to the men in charge that if there is any good to come from such a system of breeding, the blood must be intensified much faster.

With this necessity before them, the following breeding system of intensifying the blood was started: (1) that represented by using four sires in a herd closed to outside blood; (2) employment of two sires in a herd closed to outside blood and (3) use of only one sire in a herd closed to outside blood. The first procedure should result in an increase of approximately three to five percent in the inbreeding per generation; the second about six or seven percent; and the last approximately 11 to 12 percent.

Such systems will push forward purebreeding about six to 30 times faster than the breeders out on the farms are doing themselves. It is the fixing of inheritances that gives breeders increased control over inheritances. Thus it is important to know how fast this fixing can be carried forward without running into circumstances producing serious results.

There is no question but that it can be done much better with some lines of breeding and with some individuals than with others, and these lines and individuals must be discovered. To do this, the Regional Swine Breeding Laboratory is employing three systems. One involves inbreeding to establish inbred lines; in a second, selection is based entirely on rate of growth in a herd closed to outside blood in which the inbreeding is to be kept at a negligibly low level; and a third is selection in a herd started from crossing two established bacon breeds and subsequently closed to outside blood, with selections based on performance and carcass merit.

In this work, one thing to keep in mind is the kind of hog the packer wants, and, from the pro-

ducer's standpoint, a hog that is prolific, a heavy milker, efficient gainer, and with vigor to resist diseases. Therefore, let us swine producers go on record as favoring the middle-of-the-road type, not too lardy or too lean, not overly long and gangling, and not too short and chubby. The type that will mature to 200 or 240 pounds in six months is desirable.

The idea of crossbreeding hogs has run wild to some extent. The idea has been projected, and rightly so, that animals produced by crossing good individuals of established breeds make faster and more efficient gains and have more vigor. Without question, some hybrids would be better than others. Presumably, the purer the lines of breeding that are used for crossbreeding, the more advantageous the practice becomes.

The Regional Swine Laboratory is trying to build up inbred lines within a breed so that these purebred lines can be crossed together to produce hybrid vigor the same as we have in the case of hybrid corn. Real progress can be made by crossing inbred lines within a given breed if these lines can be successfully developed.

Crossbreeding to many farmers in recent years has consisted of going to a sale barn and buying a boar of different color from the sows in their possession. They know nothing of the boar's background or history, and explain their action on the fact that they are crossbreeding, with the purity of line not mattering. But it does matter to every farmer in dollars and cents, and serious thought should be given to crossbreeding while awaiting more accurate information thru work of our experiment stations and especially thru regular swine projects in the different stations which have been assigned their phases of the work with various breeds.

Line-bred and inbred boars, if they are good individuals, should give better results for crossbreeding purposes than males produced by other systems. The different stations will sell and lease boars for breeding purposes to farmers to supplement the experimental work.

Some blood lines lend themselves better to line breeding and inbreeding than others. Those that do not fit into this system of breeding should be avoided.

A Little More Room, Please

Condensed from American Agriculturist

J. C. Huttar

THERE are a lot of chickens that know what Hitler means when he says he wants "Lebensraum" (room to live) for the German people.

Crowded brooder houses, crowded laying pens, crowded hoppers, and crowded nests came right along with the rapid growth of poultry flocks on farms. Some of them crowded the poultryman right out of the chicken business.

There's been some swing back from this overcrowding but it's still pretty bad in spots. The other day I saw an 8′x8′ brooder house with about 300 twelve-weeks old pullets in it. There was standing room only. Some of the birds looked as if they hadn't grown since they were two weeks old. Others were practically normal size.

This crowding isn't all a matter of floor space per bird. Sometimes it occurs at the feeders because there are too few of them. Sometimes it occurs at the nests causing fights, broken eggs, and the laying of many floor eggs, which is often the beginning of cannibalism.

I visited two Central New York farms about a year ago. One had about 800 Leghorn pullets about 16 weeks old and the other about 1300 of the same age. In fact I learned that they all came from one hatch of chicks from a New England hatchery. All these birds were out on range when I saw them. They were all getting the same grain and mash mixtures.

The range for the 800 was bigger and greener than that for the 1300.

The 800 had to get their feed out of a total of 10 four-foot hoppers, while the 1300 had a total of 260 feet of hoppers of various lengths. In other words the 800 had an average of 5 feet of hopper or 10 feet of feeding space for each 100 pullets. The 1300 had 20 feet of hoppers or 40 feet of feeding space per 100.

Well, you'd never know they were sisters under the skin. I doubt whether the 800 averaged much over 2 lbs. each, certainly not 2½ lbs. The 1300 looked about half again as large.

I'll concede that there were a few other little differences in the care of these two flocks. The man with the 1300 had no other farm work, while the other man had a

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big farming operation in addition to his poultry. Yet I don't think his birds were ever really neglected except for feeding and housing space. But the larger flock also had more waterers per 100 birds and the water in them was changed two and three times a day during warm weather.

I still think the hopper space made the big difference.

Overcrowding can be the real thing back of many a disease outbreak because it tends toward some undernourishing which lowers the birds' resistance against disease. It increases ventilation problems too.

Some folks crowd chickens because they don't know any better. Many, however, do it because they think they're gaining in labor or housing and equipment capacity. That's a mistake.

On this page are some figures which seem to be sufficient for good results. I would give them as minimum figures, however.

Space Requirements for Layers and Breeders

Housing and Equipment	Leghorns	Heavy Breeds
Hen house floor space: square feet per bird	3½	4
Roost pole space: inches per bird	7	9
No. of		
Nests or feet of nest boxes per 100 birds	20	20
3 gal. waterers per 100 birds	3	3
5 gal. waterers per 100 birds	2	2
Float valve water pans per 100 birds	2	2
4 ft. water troughs (float valve)	½	½
5 ft. mash hoppers per 100 birds	2	2
5 ft. mash and grain hoppers per 100 birds	3	3
8 ft. mash and grain hoppers per 100 birds	2	2
Feet of calcium grit hoppers per 100 birds	2	2
Or feet of oyster shell hoppers per 100 birds	1	1
And feet of granite grit hoppers per 100 birds	1	1

SPACE REQUIREMENTS FOR CHICKS, PULLETS, AND BROILERS

	Age of Birds				
	1 Month	2 Months	3 Months	4 Months	Over 4 Months
Floor Space in Brooder House					
1 sq. ft. for each	2½ birds	1½ birds	1½ birds	1 bird	½ bird
Floor Space in Batteries					
1 sq. ft. for each	8 birds	4 birds	3 birds	2 birds	1½ birds
Feeders					
1 4-ft. feeder for each	100 birds	50 birds	40 birds	40 birds	40 birds
1 5-ft. feeder for each	125 birds	65 birds	50 birds	50 birds	50 birds
1 8-ft. feeder for each	200 birds	100 birds	80 birds	80 birds	80 birds
Waterers					
1 1-gal. waterer for each	100 birds	50 birds	40 birds	40 birds	25 birds
1 3-gal. waterer for each	200 birds	100 birds	100 birds	75 birds	50 birds
1 5-gal. waterer for each	300 birds	150 birds	150 birds	125 birds	100 birds
1 4-ft. trough for each		400 birds	400 birds	300 birds	300 birds
Roosts					
1 ft. of perch for each		5 birds	4 birds	3 birds	2 birds

The Influence of Sustained High Fat Intake Upon Milk Fat Production

Condensed from Guernsey Breeders Journal

N. N. Allen and J. B. Fitch

University of Minnesota

LARGE increases in fat intake of dairy cows by addition of any of a number of common fats have been shown to cause an immediate increase in the fat content of the milk and in milk fat yield, but the influence of continued high-fat intake has not been demonstrated.

In 1939 the influence of six different fats, including butter fat, lard and linseed, coconut, soybean and corn oils, fed at a level of 1.5 pounds daily over fifty-day periods was studied in comparison with a ration similar in every respect except that 3.4 pounds of a mixture of equal parts of cornstarch and sucrose replaced the fat. Two cows in early lactation and as nearly matched as possible for productive level were used for each of the fats. The reversal plan was followed with each pair of cows.

The cows receiving butter fat and lard showed decidedly higher test and milk fat production during the period of high-fat intake than during the period of low-fat intake. Slight increases were observed with linseed and coconut oils and marked decreases for soybean and corn oils. A similar trial was carried out in 1940 using butter fat, lard, tallow and coconut, cottonseed, peanut, soybean and corn oils.

The fat content of the milk and the yield of milk fat were markedly higher during the period of high-fat intake with butter fat, lard, tallow and coconut and cottonseed oils, and slightly higher with peanut oil. With soybean oil the test was slightly lower. With corn oil pronounced decreases in both test and fat yield were observed.

With all fats except the soybean and corn oils the results are in agreement with those observed previously with five-day periods. The stimulating influences appeared to be exerted throughout the fifty-day periods, although greatest immediately after the change of rations.

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With soybean oil and with corn oil the sustained effect seemed to be in direct contradiction to that previously noted over five-day periods. Comparing the production for the five days immediately preceding and following the change of fat intake, it was found that the test was higher in the high-fat period with soybean oil. With corn oil the test was slightly lower when the oil was fed, but the depressing effect was not as great as that observed with continued feeding. This suggests the presence of a depressing agent in the corn oil and possibly in the soybean oil which is slow in exerting its influence to the point of overcoming the stimulating influence which other constituents of the fat might be expected to have. Further work is being carried out with a greater number of cows to determine whether this depressing action is characteristic of corn oil and to determine the causative factors.

Holds Alfalfa Stand

Paul Davidson, El Paso County, Texas, keeps a good stand of alfalfa by sowing 10 pounds of alfalfa seed in first- and second-year hay each August. This keeps grass seed from getting started in the alfalfa and he obtains maximum yields of hay.

Bromegrass

Condensed from Farm Science Reporter

C. P. Wilsie and H. D. Hughes

IT took the blistering hot, drouthy summers of 1934 and 1936 to get Iowa farmers interested in bromegrass as a pasture crop. In those years—and in other hot, drouthy periods—bromegrass pastures have been far superior to bluegrass.

C. Y. Cannon estimates that a bromegrass pasture at the dairy farm of Iowa State College provides approximately a half more feed to the acre than blue grass.

A few farmers in western Iowa have fields of bromegrass 25 to 30 years old. During 1934 and 1936, Kentucky bluegrass pastures were ruined by the excessive heat and lack of moisture, but bromegrass pastures in the same communities came through the drouth with little or no permanent injury. Because of this fine record, farmers during the past 5 years have taken a real interest in bromegrass and during that time have greatly increased its acreage.

We consider bromegrass (its scientific name is *Bromus inermis*) one of the most promising grasses for Iowa farms today. It's not only drouth-resistant and high-yielding, but a winter-hardy, long-lived perennial that is highly palatable to all kinds of livestock. It is really not a new grass, though it is new to many Iowa farmers. A native of Western Asia and probably Central Europe, it has been growing in the United States for nearly 60 years. Other names by which brome grass is known are awnless brome, smooth brome, Hungarian and Russian brome.

Bromegrass appears to be climatically adapted to much of the North Central Region from the Dakotas on the west to Ohio on the east. Iowa conditions are favorable; bromegrass remains green throughout the summers and is not injured by our severe winters.

Bromegrass spreads rather rapidly by rhizomes (underground stems) to form a sod. It has an extensive root system which goes into the soil 5 feet deep or more. The stems range from about 2 to 4 feet high. Plants are leafy, succulent and produce much palatable forage. Livestock eat bromegrass readily even when it is nearly mature.

Seed are borne in large open panicles, similar to small grain heads and ripen in Iowa during

Reprinted from the Farm Science Reporter, Ames, Iowa

the first three weeks in July. The seed are long, flat and chaffy, weighing usually from 12 to 14 pounds to the bushel.

Bromegrass starts growing in early spring and continues until late in the fall.

Young brome grass seedlings do not compete very well with weeds and rapidly growing crops. On clean fertile soil, the plants develop and spread rapidly, however, and a dense sod may be formed in 2 or 3 years.

In pure stands bromegrass often becomes unproductive or "sodbound." This condition results from a lack of available nitrogen and usually may be prevented by growing it with legumes such as alfalfa, red clover or sweet clover. If it does become sod-bound it is rejuvenated by discing and applying manure or other fertilizer high in nitrogen.

Bromegrass produces the best results on deep, fertile loams and silt loams. Soils that are poorly drained, extremely acid or low in nitrogen and organic matter are not suitable. It has done well, however, on some sandy soils which are fairly fertile. Bromegrass will endure short periods of flooding and silting, but it will not withstand flooding for long periods.

Bromegrass from different regions may vary a good deal as to plant type, leafiness, growth habits, rhizome development, resistant to disease and seed producing ability. While at present there are not different varieties as we know them in other crops, several improved strains of bromegrass have been developed in the United States and Canada.

Our experiments at the Iowa Station indicate that the best seed comes from old Iowa fields planted some years ago or from fields more recently established with seed from old Iowa fields. We have not tested strains from other regions adequately, but we believe that those from Kansas and Nebraska may be well adapted to Iowa.

Canadian strains appear to be less productive than those developed in the Middle West. Bromegrass is sensitive to day length, and Iowa summer days are considerably shorter than those in Saskatchewan and other Canadian areas. This may account in part at least for the less favorable results obtained from the Canadian strains.

Bromegrass seedlings are somewhat slow in becoming established. The seedbed should be moist, fine, firmly packed and as free from weeds as possible.

Bromegrass may well be sown in the spring, on fall-plowed land. On cornstalk land, not plowed in the fall, or on old pastures, a thorough discing usually is preferable to plowing. Using the harrow and cultipacker following

discing will aid in preparing a compact and fine seedbed. Cultipacking both before and after seeding often is helpful.

For fall seedings following small grain, the field should be plowed or disced thoroughly as soon as the grain has been removed. This gets rid of many weeds and enables one to get a good seedbed prepared by planting time.

The best two times for seeding are as early in the spring as the land can be prepared, and late summer, August 15 to September 10. The weather will determine whether spring or fall planting is best, but usually weeds bother less in the fall than in the spring. Seedings made later than September 15 may winterkill.

Bromegrass seed will germinate rapidly if the soil is moist, and if it is planted from ½ to ¾ of an inch deep. Failures to establish stands have been due in many instances to deep planting. Shallow seeding should always be practiced.

We recommend seeding bromegrass in mixtures with legumes, rather than alone. When sown with alfalfa, sweet clover or red clover, 5 to 10 pounds of seed per acre are used. The legumes, if inoculated, will add nitrogen to the soil and will tend to keep the grass from becoming sodbound. Because of the vigorous rhizome development, a scattered stand of bromegrass will spread and cover the ground, forming a thick sod within a few years.

Farmers sometimes have difficulty in sowing bromegrass because the seed is so light and chaffy. In the ordinary grain drill or seeder the seed bridges over and does not feed down through the spouts freely. Oats, barley or cracked corn are sometimes mixed with bromegrass in order to make it feed through the drill-spouts uniformly.

For early spring plantings bromegrass seed may be mixed with oats at the rate of 1 pound of bromegrass to 3 to 5 pounds of oats. The oats will serve as a nurse crop which may be pastured off in early summer or cut for hay. For late summer seedings, where a nurse crop is not desired, cracked corn may be used or small grain that has been heated sufficiently in an oven to prevent germination. Some farmers in western Iowa have used the newer grain drills equipped with agitators in the grain box and report good results without mixing in any other kind of seed.

Seed may be broadcast with an endgate seeder or a Cyclone seeder, although an even distribution and uniform depth is difficult to obtain. Going over the field twice in broadcasting—the second time at right angles to the first—aids materially in obtaining a good distribution of seed. The

cultipacker should be used after seeding, and in some instances it may be necessary to use both the harrow and cultipacker in order to cover the seed and make the ground firm.

Young bromegrass plants are small and grow rather slowly. The small grain nurse crop in spring seedings preferably should be pastured off or cut in the early dough stage for hay. If many weeds are present they should be clipped early in the summer. If rainfall is abundant, the weeds may need to be clipped two or three times the first season.

Bromegrass is one of the most palatable grasses adapted to Iowa. Its carrying capacity is especially high when grown with alfalfa or sweet clover. Neither alfalfa nor bromegrass withstand continuous close grazing without injury to the stand, so that a growth of 6 to 8 inches should be maintained during most of the season. Undergrazing when growth is most rapid in May and June is not serious, for later on in midsummer, when growth is slow, the more mature forage will be eaten readily.

To maintain a high level of production through a period of years, legumes must be maintained with the bromegrass. The pasture must be so managed that the alfalfa or clovers will not be overgrazed during the fall, or much winter injury will result. Heavy late fall grazing injures bromegrass so that it may result in markedly inferior pasture the following season.

When it is harvested in the early bloom stages bromegrass makes excellent hay. An alfalfa-brome mixture may be especially useful as a hay-pasture combination on rotated cropland. The first year such a mixture will produce mostly alfalfa in the first crop, and the second crop might be used as pasture. In the second year the first crop could be used profitably for either hay or pasture, depending upon which is needed most.

Hay yields may range from 1½ to 3½ tons per acre, the higher yield being obtained from two cuttings per season. Bromegrass hay is considered approximately equal to timothy hay in feeding value.

Where well adapted, bromegrass is excellent for reducing soil erosion. The grass cover, coming on early in the spring, is valuable in holding water, and the thick mat of roots and rhizomes aids in reducing soil losses on slopes and in waterways. Bromegrass also withstands considerable silting without injury, growing up through the new deposit of soil within a short period. It is an excellent grass for terraces, drainage outlets and buffer strips in strip cropping.

In western Iowa, farmers have

been growing bromegrass for seed for several years. With an increased demand for locally-grown, well-adapted seed, this enterprise becomes highly important.

Seed yields range from 200 to 600 pounds an acre, depending upon soil fertility, previous management and moisture. Abundant rainfall in May and early June favors seed production. The price of seed from dealers has ranged from 15 to 25 cents a pound during the last few years but probably will be lower as the crop is grown more extensively.

Clean land—free from weeds—is one of the first considerations in seed growing. Clean cultivation, with special care to rid the field of weeds for 1 or 2 years before seeding the bromegrass is desirable.

When approaching maturity the seeds turn to a purplish color, and when completely ripe they are brown. The color and firmness of the seed are important in determining when to harvest. Completely ripe seed are hard and stiff, but at the proper stage for binder harvesting they are firm and will bend but not crush easily when squeezed between the thumb and forefinger.

A grain binder may be used for harvesting bromegrass. It should be adjusted to make small bundles, bound rather tightly. Bundles will shrink greatly in drying and should be set up in small shocks to allow good air circulation.

Probably the most popular method of harvesting will be the use of the newer small combines. Proper concave adjustment and the use of a special bromegrass screen to remove pieces of stem from the seed are important in threshing.

Another method of harvesting is by means of farm-constructed stripping machines built onto old binder frames. The reel is built so that the heads of the bromegrass are raked through teeth which are spaced closely enough together to strip the seed from the plants. A hopper in place of the binder platform apron catches the seed. Fairly clean seed has been harvested in this way.

When seed is harvested with a relatively high moisture content it should be spread in shallow layers on an open floor and turned frequently until completely dry. The viability of the seed may be injured easily in storage if the moisture content is high enough so that the seed starts to heat.

The majority of farmers in Iowa will be interested in bromegrass because of its value as a highly productive palatable and most dependable pasture crop.

Goose Raising

Condensed from Pennsylvania Farmer

R. L. Scharring-Hausen

ANY farmer who has a bit of meadow or bit of waste land separate from his garden and cornfield can raise a few geese every year, and find when he comes to sell them that they have returned him a profit. Geese are grazing birds, and aside from a little growing mash to start the goslings and some corn to finish them for market, will make their growth on grass and other vegetation which otherwise might go to waste.

There are two principal breeds of geese in this country, the Gray Toulouse and the slightly small White Embden. Most of the flocks seen on farms are a mixture of the two, and for market purposes there is no advantage in having a purebred flock, although if purebreds are kept it is sometime possible to sell a little breeding stock.

Goose matings are generally made in trios, that is, one gander to two females. It is considered best to make up the matings in the fall, so that the trio will be established and ready to breed in the spring. Once they have accepted each other, geese remain mated for life, and matings should be continued as long as the eggs are fertile. Geese more than one year old make the best breeders.

Adult geese are very hardy and need no more protection during the winter than an open shed to protect them from severe storms. It is advisable, however, to provide a fenced enclosure to keep out stray dogs and foxes at night. The geese can soon be taught to go into their yard themselves as night approaches. During an open winter geese will pick up most of their living, but they relish a little whole corn as an evening feed. If snow covers the ground they should have some corn fodder, leafy hay or a few waste apples in addition.

The first eggs will be laid early in the spring, and it is a good plan to provide empty barrels laid on their sides with some straw for nesting material for them to be laid in. Geese are notional, however, and they may prefer to build their own nests in some odd corner, gathering straw and trash for the purpose and lining them with

Reprinted by permission from the Pennsylvania Farmer, Pittsburgh, Penna., March 28, 1942

down which they pluck from their own bodies. The gander generally mounts guard while his lady is laying, and will chase away all intruders.

After she has laid, a goose will generally cover her egg with the nesting material. Geese, unlike chickens, stay awake more or less during the night, and often lay very early in the morning. It is important to gather the eggs the first thing, in cold weather, or they may freeze and be spoiled in spite of protection. While geese will become broody and sit, I much prefer to use common fowls to hatch goose eggs, as goose hens are often pretty cranky and will break their eggs and trample the young goslings if allowed to sit. Some geese will not become broody at all. I also feel that it is more profitable to break up a goose if she becomes broody and try to get her to lay another clutch of eggs than to set her.

If geese are given chicken laying mash and some oyster shells just before and during the breeding season they will lay more eggs. I have known geese to lay as many as forty eggs in a season, when they were kept at it.

Goose eggs do not seem to hatch very well in incubators, and all in all it seems most convenient to hatch them under common hens. A broody Plymouth Rock or New Hampshire will cover four eggs nicely. If possible, the eggs should be set within a week after being laid. The incubation period is four weeks.

When the little goslings get out it is a good plan to take them into the house and keep them in a box covered over with a cloth and set in a warm place so that they can dry off. Otherwise they may get trampled, while sometime a cranky old cluck will pick them. After they are a day old, they can be put back with the hen, who will usually take care of them. Here on the farm we generally have an incubator running and put them in a hatching tray to dry, and then start them in a battery brooder for a week or two, after which, depending on the weather, they go into a warm outside coop without further protection.

Young goslings should be given food and water as soon as they are dried off and able to stand. We start them with chicken growing mash and water, but they also like cottage cheese, bread and milk, and chopped lettuce. If they are slow to eat at first, dip their bills first in the water and then in the feed, and they will soon understand.

Little goslings do not need as much heat as do young chicks, but they must not be allowed to get wet and chilled. We let our young geese have the run of a small yard and keep them in the coop at night and on rainy days

until they grow feathers across their backs, after which they are let run. The old geese here seem to take them over at this stage, and they all run together during the day and are shut in the fenced lot at night for protection. We have a meadow with a brook through it near the buildings, which makes a fine place for geese, but a stream is not necessary, although geese must have plenty of water to drink and shade in hot weather.

In the fall we give our geese shelled corn to fatten them for market. Some are sold at Thanksgiving time, but the main demand comes for Christmas and New Year's. I sell my geese dressed, to certain stores which I have supplied for years. I find it a convenience to have the old geese marked in some way, by a leg band, a hole punched in the web, or by some personal characteristic which can be easily recognized, so that there will be no mix-up at killing time. I do not want to sell the butcher any of my dependable old breeders by mistake, and certainly he does not want to have them.

Goose raising is a sideline, to return some profit from what otherwise might go to waste. The past fall, for instance, my geese went into the cornfield after we had husked from the stalk and gleaned all the shelled grain and missed ears. That helped to make up for the time they sneaked into the garden and got the last picking of lima beans which we had reserved for Sunday dinner.

Aside from questions of profit and minor depredations, I enjoy having a few geese around because they are always doing something interesting or amusing. I like to hear their high clear call on a brisk March morning and see them parading past in ridiculous stiff-legged dignity, or watch the geese grazing while the ganders stand with their heads up, watching for possible danger. It is fun, too, when the ganders get together for a rousing thumping match, or when the whole flock goes down to the brook for a splashing contest.

FOR THE FARMER'S LIBRARY

These books are recommended as outstanding in their field:

Beef Cattle—By Roscoe R. Snapp, Asso. Prof. Animal Husbandry, Univ. of Illinois. John Wiley & Sons, Inc. $4.00.

Beef Cattle Production in the South—By D. W. Williams, Head, Department of Animal Husbandry, A. & M. College of Texas, College Station, Texas. The Interstate Printers & Publishers (1941). $2.00.

Beekeeping—By Everett Franklin Phillips, Professor of Apiculture, Cornell University. The Macmillan Co. $4.00.

Breeding Your Own, or Raising Colts for Pleasure and Profit—By Clarence E. Bosworth. The Derrydale Press ($10.00). A book suitable for the breeders of hunters' and saddle horses.

Dairy Cattle and Milk Production—By Clarence H. Eckles, B.S.A., D.Sc., late Chief, Div. of Dairy Husbandry, Univ. of Minnesota. The Macmillan Co. $3.90.

Farm Accounting—By Donald R. Mitchell, Asst. Prof. Agri. Economics, Univ. of Wisc. McGraw-Hill Book Co., Inc. (1941). $2.50.

Farm Shop Practice—By Mack M. Jones, M.S., Prof. Agri. Engineering, Univ. of Mo. McGraw-Hill Book Co., Inc. $2.75.

Feeds and Feeding—By F. B. Morrison, Prof. of Animal Husbandry and Animal Nutrition, Cornell Univ. Morrison Press. $5.00.

Farm Meats—By M. D. Helser, B.S.A., M.S., Prof. Animal Husbandry, Iowa State College. The Macmillan Co. $2.90.

Farm Management—By Robert R. Hudelson. The Macmillan Co. $2.00.

Farm Management and Marketing—By V. B. Hart, Ext. Professor of Farm Management; M. C. Bond, Ext. Professor of Marketing; L. C. Cunningham, Ext. Asso. Professor of Farm Management; all of N. Y. State College of Agriculture, Cornell University. Publishers: John Wiley & Sons, Inc. (1942). $2.75.

Forestry in Farm Management—By R. H. Westveld and Ralph H. Peck. John Wiley & Sons, Inc. (1941). $3.00.

Hunger Signs in Crops—Published by the American Society of Agronomy and The National Fertilizer Association. $2.50.

Home Vegetable Gardening—By Charles S. Nissley, Extension Horticulturist in Vegetable Growing. Rutgers Univ. Press (1942). $1.50. $1.50.

Judging Dairy Cattle—By Edwin S. Harrison, Professor of Animal Husbandry, Cornell University. John Wiley and Sons, Inc. $2.75.

Livestock Judging Handbook—By Julius E. Nordby, Asst. Prof. Animal Husb., Univ. Idaho, and W. Malcolm Beeson, Ph.D., Asst. Prof. Animal Husb., Univ. Idaho. The Interstate Printers. $2.60.

Poultry Husbandry—By Morley A. Jull, Prof. of Poultry Husbandry, Univ. of Maryland. McGraw-Hill Book Co., Inc. $4.00.

Poultry—By A. R. Winter, Asst. Prof. Poultry Husbandry, Ohio State Univ., and E. M. Funk, Asst. Prof. Poultry Husbandry, Mo. State Univ. J. B. Lippincott Co. $5.00.

Pork Production—By William W. Smith, Prof. of Animal Husbandry, Purdue Univ. The Macmillan Co. $3.75.

Practical Poultry Management—By James E. Rice, Emeritus Professor of Poultry Husbandry, and Harold E. Botsford, Extension Professor of Poultry Husbandry, both at New York State College of Agriculture. Fourth Edition (1940), John Wiley & Sons, Inc. $2.75.

Sheep Production—By Levi Jackson Horlacher, B.S.A., M.A., Asst. to Dean, Col. Ag. Univ. Ky. McGraw-Hill Book Co., Inc. $4.00.

Soil Conservation—By Hugh Hammond Bennett, Chief, Soil Conservation Service, U. S. Department of Agriculture. McGraw-Hill Book Company, Inc. $6.00.

Some Common Diseases of the Horse—By George R. Conn, B.S.A.H., D.V.M., Orange Judd Publishing Co., Inc. (1942). $1.50.

Some Common Diseases of Cattle—By George R. Conn, B.S.A.H., D.V.M. Orange Judd Publishing Co., Inc. (1942). $1.50.

Vegetable Crops—By Homer C. Thompson, Ph.D., Prof. Veg. Crops, Cornell Univ. McGraw-Hill Book Co., Inc. $5.00.

The Western Horse—Its Training, Type and Marketing. By John A. Gorman, Asso. Prof. Animal Production, Univ. of Wyoming. The Interstate Printers and Publishers. $1.65.

BOOK NOTES

Livestock Production—By Walter H. Peters, Chief of the Division of Animal and Poultry Husbandry, University of Minnesota.

Here is an excellent coverage of the most effective methods used in producing beef and dairy cattle, swine, sheep, goats, horses, and mules. Livestock producers, agricultural agents, and others concerned with best practices in animal husbandry will value this book for (1) its concise descriptions of the important breeds of farm animals, (2) the specific pointers on improving them, (3) the factual notes on their adaptations to production, (4) the all-round information for the solution of everyday problems, and (5) the practical guidance in matters essential to successful livestock production.

Publishers: McGRAW-HILL BOOK CO., INC. (1942). $3.50.

The Farm Primer—By Walter Magnes Teller, formerly with the Farm Security Administration, United States Department of Agriculture.

This is a practical manual, handbook, and reference book for the beginner and part-time farmer.

Publisher: DAVID McKAY COMPANY. (1942). $2.50.

For the convenience of our readers, books listed may be purchased through this Department. Address Farmers Digest, Ambler, Pa.

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